

This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

LANE MEDICAL LIBRARY STANFORD
2940 0294 0762 2

nts of

THE STATE BOARD OF HEALTH,

Office at Lansing, Michigan

LANE

MEDICAL 

LIBRARY

LEVI COOPER LANE FUND

TWENTY-THIRD ANNUAL REPORT

OF THE

SECRETARY

OF THE

STATE BOARD OF HEALTH

OF THE

STATE OF MICHIGAN.

FOR THE

FISCAL YEAR ENDING JUNE 30, 1895.



MICHIGAN STATE BOARD OF HEALTH SEAL.

BY AUTHORITY.

LANSING
ROBERT SMITH PRINTING CO., STATE PRINTERS AND BINDERS
1896

RESOLUTION OF THE BOARD RELATIVE TO PAPERS PUBLISHED IN ITS ANNUAL REPORT.

Resolved, That no papers shall be published in the Annual Report of this Board except such as are ordered or approved for purposes of such publication by a majority of the members of the Board; and that any such paper shall be published over the signature of the writer, who shall be entitled to the credit of its production, as well as responsible for the statements of facts and opinions expressed therein.

Office of the Secretary of the State Board of Health,
LANSING, MICHIGAN, *May, 1896.*

To HON. JOHN T. RICH, *Governor of Michigan:*

SIR:—In compliance with the laws of this State, I present to you the accompanying Report for the fiscal year ending June 30, 1895.

Very respectfully,

HENRY B. BAKER,

Secretary of the State Board of Health.

26717

CONTENTS.

[PART I.]

	Page
Title page	iii
Resolution relative to papers in the Annual Report	iv
Letter of transmittal to the Governor of Michigan	v
Contents	vi-viii
Introductory Statement, Members of Board, Names, Residences, Terms of Office, Committees	ix-xi
Work of the Board, fiscal year 1895	xi-xli
Sanitary Conventions	xi-xii
Union City (October 25 and 26, 1894) Program carried out	xi-xii
Charlotte (November 22 and 23, 1894) Program carried out	xii
Examination of Plans for Proposed Public Buildings	xiii
Regular and Special Meetings of State Board of Health	xiii-xli
Lansing (Regular meeting, July 13, 1894)	xiii-xviii
Lansing (Regular meeting, October 12, 1894)	xviii-xxi
Charlotte (Special meeting, November 22, 1894)	xxi-xxii
Lansing (Regular meeting, January 11, 1895)	xxii-xxvi
Lansing (Special meeting, February 1, 1895)	xxvi-xxx
Lansing (Special meeting, March 13, 1895)	xxx-xxxii
Lansing (Regular meeting, April 12, 1895)	xxxii-xl
Lansing (Special meeting, May 17, 1895)	xli
President's address	xxxv-xxxviii
Work in the Office of the Secretary of the Board	xli-cxlix
Abstract of the Secretary's Quarterly Reports	xli-lxxi
Secretary's Report for Quarter ending September 30, 1894	xli-xlviii
Secretary's Report for Quarter ending December 31, 1894	xlviii-lvii
Secretary's Report for Quarter ending March 31, 1895	lvii-lxv
Secretary's Report for Quarter ending June 30, 1895	lxv-lxxi
General Report of the work of the Office of the Secretary during fiscal year ending June 30, 1895	lxxi-lxxx
Collection and Compilation of Information	lxxi-lxxiv
Returns of Names and Addresses of Health Officers	lxxi-lxxii
Special Reports of Dangerous Diseases	lxxii
Sickness Statistics: Weekly Postal-Card Reports	lxxiii
Annual Reports by Health Officers, for year 1894	lxxiii
Annual Reports by Clerks of Boards of Health, for year 1894	lxxiii
Return of Names of Medical Practitioners	lxxiv
Meteorological Reports	lxxiv
Dissemination of Information	lxxiv-lxxx
Published List of Names and Addresses of Health Officers	lxxiv
Distribution of Information how to Restrict Dangerous Diseases	lxxiv-lxxv
Printing and Distribution of Secretary's Annual Report	lxxv
Printing and Reprinting Leaflets, Diagrams, etc	lxxv-lxxviii

General Report of work of the Office of the Secretary—*Continued.*
Dissemination of Information—*Continued.* Page
Instructions to Newly-Appointed Health-Officers lxxviii
Diagrams of Instructive Experience in Michigan lxxix
Health Bulletins, Weekly, Monthly and Quarterly lxxviii-lxxix
Abstracts of Proceedings of Meetings of State Board lxxix-lxxx
Secretary's Quarterly Report of Work in Office lxxx
Reprints lxxx
A very bad system of heating and ventilation at the Michigan School for the Blind lxxx-lxxxiii
Report on best methods of disposal of excreta and waste waters at Harbor Point, Michigan. lxxxiii-lxxxv
Obituary notice of Dr. H. F. Lyster, of Detroit, Mich. lxxxv-lxxxv[1]
The State Quarantine Law,—The law is constitutional, but not very useful lxxxvi-xci
International Congress of Hygiene and Demography at Buda-Pesth xci-civ
The care of poor persons having a dangerous communicable disease is a charge upon the county civ
Eligibility and qualifications of a health officer xcv-xcvi
National Conference of State Boards of Health xcvi
A plea for an efficient National System of Quarantine xcvii-xcix
Steam Disinfection xcix-c
Public-Health Legislation and proposed Legislation in Michigan, in 1895 c-cxxxvii
Clerks, expenditures in last fiscal year, and estimate for the present year civ-cviii
Estimates of expenses, for present year, and succeeding years cvi-cx
Objections to the Miller Bill cx-cxxviii
Statements prepared by Secretary Baker in reply to charges made by A. C. Gongwer and Representative Miller cxvii-cxxvi
Introduction and consideration of the "Bialy Bill" in the Senate cxxviii
Final action on the "Miller Bill" cxxix
Legislative Investigation asked for by the State Board of Health cxxix-cxxxv
Report of committee to investigate the State Board of Health cxxxv-cxxxvii
Report of Secretary, Relative to Property, etc., for the fiscal year ending June 30, 1895 cxxxvii-cxlix
Photo-Engraved Plates Purchased cxxxviii
Property Loaned cxxxviii
Property returned cxxxviii
Meteorological Instruments, etc., Purchased cxxxviii
Meteorological Instruments Issued cxxxix
Meteorological Instruments broken while in use cxxxix
Meteorological Instruments and Other Property on Hand cxxxix
Accessions to the Library cxxxix-cxlv
Loans from the Library cxlvi-cxlviii
Paper on hand at end of fiscal year cxlviii
Amount and Classification of Postage during Fiscal year cxlviii
Amount and Classification of Expenditures during Fiscal year cxlix
Amount and Classification of Expenditures during Calendar year cxlix
Expenditures on Account of the Board cxlix

[PART II.]

Principal Meteorological conditions in Michigan in 1894 1-80
Time of Greatest Prevalence of Each Disease in Michigan in 1894 81-147
Communicable Diseases in Michigan in 1894 148-472
Diphtheria in Michigan in 1894 175-227
Scarlet Fever in Michigan in 1894 228-273
Rothëln (German measles) in Michigan in 1894 274-275
Typhoid Fever in Michigan in 1894 276-330
Measles in Michigan in 1894 331-373
An alleged case of Typhus Fever in Michigan in 1894 374-376
Whooping-cough in Michigan in 1894 377-378

	Page
Small-pox (variola) in Michigan in 1894	379–415
Chicken-pox (varicella) in Michigan in 1894	416–418
Consumption in Michigan in 1894	419–446
Erysipelas in Michigan in 1894	447
Disinterment and Removal of Dead Bodies, Correspondence relative to	447–451
Suspected Tyrotoxicon sickness in Michigan in 1894	452
Lead Poisoning in Michigan in 1894	452–453
Poisoning from Dried Beef in Michigan in 1894	453–454
Suspected Poisoning by Pressed Chicken at Sturgis	454
"Foot and Mouth Disease" in Michigan in 1894	454–455
Hydrophobia (Rabies) in Michigan in 1894	456–464
Glanders, Affecting Animals, in Michigan in 1894	464–468
Hog Cholera in Michigan in 1894	468–469
Lump-Jaw (Actinomycosis) in Michigan in 1894	470–472
Injuries and Loss of Life and Property by use of Kerosene in Michigan in 1894	473–484
Injuries and Loss of Life and Property by use of Gasoline in Michigan in 1894	485–487
Alleged Nuisances in Michigan in 1894	488–515
Alphabetical Index	517–566
E rata	567

REPORT.

[PART I.]

This is the Twenty-Third Annual Report of the Secretary of the Michigan State Board of Health, and is for the fiscal year ending June 30, 1895. It is arranged in two parts. The first part contains the Secretary's report of the work of the Board, of the work of the Office of the Board, and the annual report of property, including accessions to the library, with names of donors. The second part contains papers, abstracts and reports,—including one on the "Principal Meteorological Conditions in Michigan in 1894", one on "Time of Greatest Prevalence of Each Disease", being a study of the Causes of Sickness in Michigan especially in 1894, one on the dangerous "Communicable Diseases in Michigan in 1894",—Diphtheria, Membranous Croup, Scarlet Fever, Typhoid Fever, Small-pox, Measles, Whooping-Cough, Consumption, Erysipelas, Rotheln, Mumps, Influenza, Catarrh, Glanders, Rabies (hydrophobia), Actinomycosis (lump-jaw), Foot and Mouth Disease, Lead-pipe Poisoning, Poisoning by Dried Beef and Pressed Chicken, Tyrotoxicon, one on "Injuries and Loss of Life and Property from the Use of Kerosene", one on "Injuries and Loss of Life and Property from the use of Gasoline", and one on "Alleged Nuisances in Michigan in 1894."

The publication of this Report has been much delayed by several causes, operating in preceding years, including the inauguration and prosecution of new lines of work which have seemed to be demanded, as, for instance, the immigrant inspections, baggage disinfection, etc., during threatened cholera, and the natural increase of the work, due to increasing population of the State, and more especially to increasing attention to sanitary affairs throughout the State, the office force not having been increased correspondingly.

Under the law, the Secretary of the Board is required to disseminate information "through an Annual Report and otherwise," and, by direction of the Board, he issues immediately after the close of each week a bulletin which shows the sickness during the week just passed; also a monthly bulletin; and sometimes publishes quarterly proceedings of the work of the Board and the condition of Health in Michigan during the quarter. The proceedings of sanitary conventions are published as soon as practicable after the occurrence of each convention. The office dis-

seminates information by means of the telegraph, the telephone, by letter, and by means of hektographed statements prepared and distributed to leading newspapers in Michigan.

Thus items of sanitary work in Michigan which are regarded as useful "news" are published at once in the comparatively ephemeral bulletins, etc., while the Annual Report is issued, not as a newspaper or journal is, as an ephemeral publication, but as a permanent official record of the work of the State Board of Health, and in the office of the Board, and of the local boards of health throughout the State. The Annual Report contains also statistics which require a great deal of painstaking care in their preparation, but which it is hoped will be useful, for all time to come, to those who study the causation of diseases; and through their labors, to the people of the State and country; and the statistics are there preserved in a permanent form, accessible, for purposes of study, to a comparatively large number of persons.

However, only about six thousand copies of the Annual Report are printed, to supply the two millions and more inhabitants of Michigan; and only 3,500 of those copies are at the disposal of the State Board of Health. Of these, some are sent to libraries, some are sent in exchange for the publications of other State Boards of Health, of prominent city boards of health, of sanitary journals, etc.; others are sent to persons likely to make good use of them, including each of the fifteen hundred health officers in Michigan.

To this Report there are two Supplements, containing proceedings and addresses at the Sanitary Conventions held at Union City and Charlotte.

The papers in the Supplement as well as those in this Annual Report, are printed subject to a resolution of the Board, printed on page vi.

The names and postoffice addresses of the members of the Board, and the dates of the expiration of their terms of office, are as follows:—

Victor C. Vaughan, M. D., Ph. D., Ann Arbor, Jan. 31, 1895.
Delos Fall, M. S., Albion, Jan. 31, 1895.
Mason W. Gray, M. D., Pontiac, July 1, 1897.
Hon. Frank Wells, *President of the Board*, Lansing, July 1, 1897.
Samuel G. Milner, M. D., Grand Rapids, Jan. 31, 1899.
George H. Granger, M. D., Bay City, Jan. 31, 1899.
Henry B. Baker, M. D., *Secretary of the Board*, Lansing.

With the exception of the secretary, the members of the Board are appointed for the term of six years, and receive no salary or *per diem* compensation for their services.

STANDING COMMITTEES.*

1. Epidemic, endemic and communicable diseases. — Victor C. Vaughan, M. D.
2. Sewerage, and the disposal of excreta.—Mason W. Gray, M. D.
3. Water supply, including purification of sewage-contaminated water. —Prof. Delos Fall, M. S.
4. Buildings, including house drainage, ventilation, heating, etc.— Samuel G. Milner, M. D.
5. Climate, geology, topography, and drainage.—Henry B. Baker, M. D.

* Committees as rearranged by President Wells and approved by the Board Sept. 29, 1893. Members assigned to various Committees, October, 1893.

6. Foods, drinks and their adulterations.—Victor C. Vaughan, M. D.
7. Poisons, explosives, etc.—Prof. Delos Fall, M. S.
8. School hygiene and sanitation.—Samuel G. Milner, M. D.
9. Sanitary inspections in cities and villages.—Prof. Delos Fall, M. S.
10. Statistics of mortality and sickness.—Henry B. Baker, M. D.
11. Public-health legislation—George H. Granger, M. D.
12. Finances of the Board.—Hon. Frank Wells.
13. Animals diseases dangerous to man.—Mason W. Gray, M. D.
14. Relations of preventable sickness to taxation.—George H. Granger, M. D.
15. Quarantine at the Michigan border and within the State.—Hon. Frank Wells.

WORK OF THE STATE BOARD OF HEALTH DURING THE FISCAL YEAR ENDING JUNE 30, 1895.

Aside from the work in committees and in connection with the office of the secretary of the Board, the work of the State Board of Health itself includes that done by means of sanitary conventions, the examination of plans and specifications for proposed public buildings, under Sec. 7, Act 206, laws of 1881, § 418, Howell's Statutes, amended by Act 86, Laws of 1889, and work done at regular and special meetings.

SANITARY CONVENTIONS.

Two successful sanitary conventions were held during the fiscal year ending June 30, 1895, as follows:—

UNION CITY SANITARY CONVENTION, OCTOBER 25 AND 26, 1894.

At the Sanitary Convention at Union City, the following program was carried out:

Welcoming Address, by Hon. J. S. Nesbitt.
Response, by Hon. Frank Wells.
Address, by Hon. M. A. Merrifield.
The Germ Theory of Disease, by Prof. Victor C. Vaughan, M. D.
Discussion of the Subject, by Hon. J. J. Woodman and others.
Address, by Hon. Cyrus G. Luce, Ex-Governor of Michigan.
Restriction and Prevention of Dangerous Communicable Diseases:
From Standpoint of Lawyer, by George Styles.
" " " the Clergyman, by Rev. H. S. Mills.
" " " the Board of Health, by Hon. D. D. Buel.
" " " the Press, by Hon. D. J. Easton.
" " " the State Board of Health, by Prof. Delos Fall, M. S.
Small-pox and its Restriction and Prevention, by Henry B. Baker, M. D.
Discussion of the subject, by Hon. Frank Wells.
Alcohol and Narcotics, by Prof. H. W. McIntosh.
Discussion of the Subject, by Hon. J. J. Woodman and Prof. Delos Fall, M. S.

The Milk Supply of a City, in the Light of Modern Bacteriological Research, by John H. Kellogg, M. D
Ventilation and Heating, by Mark T. Clay, M. D.
Discussion of the Subject, by Hon. Frank Wells.
The Germ Theory of Disease, by S. H. Clizbe, M. D.
School Sanitation, by Prof. H. W. McIntosh.
The Water Supply of Union City, by Prof. N. P. Collins.
Discussion of the Subject, by Prof. Delos Fall, M. S.
The Prevention of Tuberculosis, by E. H. Hurd, M. D.
The Restriction and Prevention of Tuberculosis, by Henry B. Baker, M. D.
The Disposal of Waste and Excreta in Union City, by S. B. Frankhauser, M. D.
Discussion of the Subject, by Hon. Frank Wells.
Remarks by George Styles and Hon. Frank Wells.
Memorial to the Legislature Relative to State Hospital for Consumptives.
Resolution for Memorial to Legislature relative to Tuberculosis in Animals.

CHARLOTTE SANITARY CONVENTION, NOV. 22 AND 23, 1894.

At the Sanitary Convention at Charlotte the following program was carried out:

Prayer, by Rev. Mr. Lewis.
Address of Welcome, by Hon. Frank Merrit, M. D., Mayor.
Response, and Statement of the Objects of the Convention, by Hon. Frank Wells.
Address by the President of the Convention, Hon. Frank Merrit, M. D.
The Education of the People on Sanitary Subjects, by Rev. H. S. Roblee.
Discussion of the Subject.
Rabies-Hydrophobia, by Theo. R. MacClure.
Restriction and Prevention of the Dangerous Communicable Diseases, by Mason W. Gray, M. D.
Restriction and Prevention of the Dangerous Communicable Diseases, from the Standpoint of a Lawyer, by John M. Corbin.
Restriction and Prevention of the Dangerous Communicable Diseases, from the Standpoint of a Mother, by Mrs. D. B. Davidson.
Discussion of the Subject, by Mrs. G. A. Perry and others.
The Germ Theory of Disease, by Prof. Victor C. Vaughan, M. D.
Duties and Powers of Local Health Officers, by Judge H. S. Maynard.
Discussion of the Subject.
Sewerage, Drainage and Disposal of Waste, by G. B. Allen, M. D.
Discussion of the Subject, by Prof. Delos Fall and others.
The Restriction of Scarlet Fever and Diphtheria, by William Parmeter, M. D.
Discussion of the Subject, by Dr. F. A. Weaver.
Milk and Milk-Supply of Charlotte, by Dr. Sara J. Allen.
School Hygiene, as relates to Eyes of Pupils, by Prof. Fleming Carrow, M. D.
School Hygiene, Prof. O. L. Miller.
Discussion of the Subject, by Prof. Delos Fall and others.
A Plea for Better Methods for Teaching Hygiene in the Public Schools, by Prof. Delos Fall, M. S.
The Restriction and Prevention of Typhoid Fever, with Special Reference to Ground Water, by Henry B. Baker, M. D.
Sanitary Condition of Jails and Poorhouses, by Judge Clement Smith.
Discussion of the Subject, by Prof. Delos Fall and others.
Water and Ice, by Dr. Mary E. Green.
Discussion of the Subject, by Dr. W. E. Newark and others.
The Prevention of Consumption, by Dr. Henry B. Baker, M. D.
Discussion of the Subject.
Closing of the Convention, Resolutions, etc.

EXAMINATION OF PLANS FOR PROPOSED NEW PUBLIC BUILDINGS, SEWERAGE, VENTILATION, OR HEATING FOR STATE INSTITUTIONS.

During the fiscal year ending June 30, 1895, no plans were submitted to the State Board of Health for examination, under the law, Act 206, Laws of 1881, (§ 418 Howell's Statutes) as amended, Section 7, of Act 86, Laws of 1889, therefore, no report of an examination appears in this Annual Report.

REGULAR AND SPECIAL MEETINGS OF THE STATE BOARD OF HEALTH, DURING THE FISCAL YEAR ENDING JUNE 30, 1895.

REGULAR MEETING AT LANSING, JULY 13, 1894.

The meeting was called to order by President Wells; Prof. Fall of Albion, Doctor Vaughan of Ann Arbor, and Secretary Baker of Lansing were present. Dr. Gray of Pontiac, had informed the Secretary that it would be impossible for him to attend the meeting. Nothing was heard from Dr. Milner of Grand Rapids and Dr. Granger of Bay City.

The minutes of the special meeting of the Board at Lansing, May 3, were read by the Secretary, and approved by the Board.

The minutes of the Special meeting of the Board at Ann Arbor, June 15, were read by the Secretary, and approved by the Board.

The Secretary presented the minutes of the last regular meeting, at Lansing, April 13, 1894. The proceedings of that meeting having been published, on motion of Doctor Vaughan, the reading of these minutes was dispensed with, and they were approved as written by the Secretary.

The Secretary read the minutes of the joint-meeting of the State Live Stock Sanitary Commission, and the State Board of Health, held at Ann Arbor, June 15, 1894. The minutes were approved by the Board.

On motion of Doctor Baker, it was voted that the Abstract of Proceedings of this meeting be printed in pamphlet form in sufficient numbers to make the regular distribution. It was also understood that the Proceedings of the joint-meeting at Ann Arbor would probably be included in the Abstract of this meeting, as well as the Proceedings of the Second Annual Conference of Michigan Health Officers.

State Board of Health voucher numbers 2446 to 2458, inclusive, were allowed by the Board.

The Secretary read a list of twenty items of business which he wished to bring before the Board if there were opportunities.

The causation and prevention of rheumatism.

President Wells said that he had long noticed that the weekly Health Bulletins, published by the State Board, show that of the twenty-eight diseases reported upon by the regular observers around the State, Rheumatism is usually at the head of the list, causing the most sickness in Michigan. Mr. Wells raised the question whether there was anything that this Board could do in the way of publication of information which might tend to lessen the amount of sickness from rheumatism.

Dr. Vaughan said he knew of nothing tangible yet relating to the restriction and prevention of rheumatism which could be imparted to non-professional people. Rheumatism is a term used for many aches and pains. He thought that no work should be undertaken now which would interfere with the effort being put forth by this Board for the restriction and prevention of tuberculosis the most important of all diseases.

Dr. Baker remarked that the State Board had already done much for the creation of knowledge respecting the causation of rheumatism, which knowledge is essential to a proper action for its prevention. But we must wait for an advance in two lines of investigation not much entered upon by this Board as a whole—that of bacteriology and that of physiological chemistry. Several times in the past it has seemed that facts were going to crystallize into a tangible theory; but, just as appearances were most favorable, ideas of medical investigators regarding the causation of the disease have changed. Much has been learned from the sickness statistics collected and published by this Board. Curves have been made showing that rheumatism has a direct relation to meteorological conditions. The facts in this Office show that tonsillitis follows the cold atmosphere, and that rheumatism follows tonsillitis. It is quite probable that if rheumatism is a germ disease, tonsillitis prepares a soil favorable to the reproduction of the germ, and a way for its entrance into the body. We are waiting for the bacteriologists to find the specific organism. So far as I know only the pus-forming germs have been found in connection with rheumatism, and it is quite possible that they are the cause of the disease; if so, its increase following the sore throats caused by "raw" cold weather is explained by the facts on record in the Office of the State Board of Health. Diagrams exhibiting the rise and fall of rheumatism by seasons of the year prove that its course is similar to that of small-pox, consumption and other diseases known to be caused by germs, and known to enter the body by way of the air-passages. Secretary Baker suggested that a committee might be appointed to investigate the subject, and report to this Board at some subsequent meeting.

Doctor Vaughan said that at the present, all is speculation as to the causation of rheumatism; but he thought it quite probable that Doctor Baker's idea of the causation of rheumatism may be nearly the proper explanation; but that he would explain the excess of uric acid—the alleged cause of rheumatism, as being a result of the over exertion or unusual destruction of the cells of the body in trying to protect the body from an attack of a germ disease; in other words it is an over-drugging on the part of nature in order to throw off an attack of some germ disease. The uric acid, which is not excreted rapidly enough and which accumulates in the body and causes the rheumatic pains, is formed by the action and destruction of cells.

On motion of Prof. Fall it was voted that Dr. Baker prepare, and read at a future sanitary convention, a preliminary paper on the causation, restriction and prevention of rheumatism.

The Secretary presented a tabular statement showing the small-pox situation in Michigan from Jan. 1 to July 11, 1894.

The Secretary presented his report of property on hand, purchased used and destroyed during the year ending June 30, 1894. The financial part of the property report was referred to the Committee on Finance. On motion the report was approved and adopted.

As delegate to the meeting of representatives of State Boards of Health, in Chicago, May 9 and 10, 1894, Secretary Baker mentioned that the meeting was held for the purpose of considering the small-pox situation in the United States, and especially in Chicago. He presented a short report* of the meeting, which he had prepared, and a complete stenographic report which had recently been received from Dr. Probst, Secretary of the Chicago meeting.

The Secretary presented and read portions of his report of work done in the office during the quarter ending June 30, 1894.† The Secretary put much stress on that part of the report relating to the proposed circular for "Local Health Regulations". Considerable discussion followed, and it was voted by the Board that the Secretary's draft, Mr. Wells' criticism and proposed substitute, and Prof. Fall's ideas, be referred to Prof. Fall to prepare and report upon the subject at the next meeting.

Secretary Baker presented an invitation from the Common Council of Charlotte, for the Board to hold one of its sanitary conventions in that city, the council having appointed a committee to confer with this Board. After consideration, the President was authorized to appoint a Committee to meet with the local committee at Charlotte, to make arrangements for the proposed convention. Prof. Fall and Dr. Baker were made that committee.

A petition signed by the President, trustees and a large number of prominent citizens of Union City, asking for a sanitary convention, was read by the Secretary; and, after consideration, the president was authorized to appoint a committee of this Board to visit and make arrangements for a convention at Union City. The President appointed Prof. Fall as that committee.

President Wells suggested that in making arrangements for the proposed conventions, it be understood that the locality shall supply a stenographer.

The Secretary said that he had had some conversation with Dr. L. C. Read, Surgeon at the Soldier's Home, Grand Rapids, relative to the foul water supplied to some of the school children in Grand Rapids. It was expected that the Board would be requested to hold a convention in Grand Rapids. The members thought that it was rather premature to take any action at this meeting, and the subject was deferred until some subsequent meeting.

On motion of Dr. Baker, the Board voted to authorize the Secretary to print 10,000 copies of the pamphlet on the prevention of typhoid fever.

The Secretary presented the question whether the Board would authorize the reprinting of the leaflet on "Typhoid and Typho-Malarial Fever." The Secretary was directed to include in the pamphlet on the prevention of typhoid fever the points of greatest value in the leaflet on "Typhoid and Typho-Malarial Fever".

The question of reprinting the pamphlet on restriction and prevention of small-pox was submitted. On motion of Dr. Vaughan it was voted that the Secretary modify the pamphlet on "The Prevention of Small-pox", make it shorter, and print 10,000 copies.

The question of reprinting Dr. Vaughan's paper on Cholera Infantum, was presented. The paper had some time since been referred to Dr.

* This short report of the meeting of Health Officials in Chicago, May 9 and 10, 1894, is printed on pages cxiii-cxv of the Report for 1894.

† The Secretary's report of work in the office during the second quarter of 1894 is printed on pages lx-lxxiii of the Report of this Board for 1894.

Vaughan with a request that he make any revision he saw fit. Doctor Vaughan said he had not revised the paper, and that it ought not to be printed until it was revised. As Dr. Vaughan was about to start for Europe, and would probably not have time to revise the leaflet, no action was taken.

The Secretary presented a report received from the Secretary of the Wisconsin State Board of Health on an investigation of the small-pox at Fort Howard, Wis., which spread to Menominee, Mich. It was placed on file with the other data relative to small-pox in Menominee, Mich.

President Wells presented the subject of a delegate to the International Congress of Hygiene, at Budapest, Hungary, Sept. 1–9, 1894, and said that he believed that the Board ought to pay at least a portion of the expenses of such a delegate. Mr. Wells remarked that Dr. Vaughan had done much original work for the Board, and is now engaged in a line of work which is important to humanity and science, and for which he is going to the Congress where he will come in contact with all the scientific men from civilized countries, and especially with other men working in the same line as are his studies in connection with Nucleins. The Board having established a precedent by sending Dr. Baker to Mexico, I believe the Board should aid Dr. Vaughan in his trip abroad.

On motion of Dr. Baker, the Board appointed Dr. Vaughan a delegate to the International Congress of Hygiene, at Budapest, Sept. 1-9, 1894.

On motion of Prof. Fall (and supported by Dr. Baker) the Board voted to appropriate the sum of $150.00 to defray a part of Dr. Vaughan's expenses as delegate to the Congress at Budapest.

On motion of Dr. Baker, it was voted that Prof. F. G. Novy, Asst. Director of the State Laboratory of Hygiene, act as a representative of the Board at the Congress, without expense to this Board.

As delegate to the meeting of the American Climatological Assoc., at Washington, May 29-31, 1894, Dr. Vaughan reported somewhat as follows: The principal paper at the meeting of the Association was that of Dr. A. C. Abbott, of Philadelphia, on the subject of sewer gas. Dr. Abbott related in detail accounts of a great many experiments he had been making, and the result of a large number of bacteriological examinations of sewer gas. He found no germs, and his conclusions were practically "that sewer gas was not dangerous". I was on the program for a discussion of Dr. Abbott's paper; but, as the paper was about one and one-half hours long and had occupied all the time allotted to that subject, and I was expected to discuss an hour and one-half paper in five minutes, I said that, as it was probable that I could not agree with any point in Dr. Abbott's paper, I would like to be excused, and I was kindly excused. It seems that he took sewage, passed bubbles of air through it, and suspended over it culture material. No germs were found. None ought to have been expected to be found, because we have long known that germs are not given off from moist surfaces. The experiments have no bearing on the subject, because they take no account of the many surfaces where sewage, containing germs, may dry, and then the germs be liberated by currents of sewer air. I believe that sewer air may in that manner at any time become dangerous.

Dr. Vaughan left at 4:45 to catch his train.

Dr. Baker, as Committee on Climate, etc., presented the subject of the "Decrease of the amount of carbonic acid gas in the Atmosphere," and remarked that some twenty years ago he had asked the State Board of

Health to authorize a series of regular and accurate chemical analyses of the atmosphere with a view of determining whether there was any change in the amount of the carbonic acid gas in the atmosphere by seasons of the years, and by a long period of years. The subject is important now, and may become more so, in relation to the public health. Doctor Baker quoted from the *Chemical News*, London, Aug., 1893, as follows: "As evidence that the composition of the atmosphere is still slowly changing, it is stated that the last and most careful determinations of carbonic acid in the air have shown a decided decrease (0.05 to 0.03) in the last fifty years." On motion of Dr. Baker, the subject was referred to Prof. Fall, of Albion, with request that he should report at the next meeting of this Board, relative to methods, and cost of the proposed series of tests of the atmosphere.

The Secretary mentioned that he had been requested to write to the Hon. F. S. Wheat of Caro, Committee of the Board of Control for the State School for the Blind, on Heating and Ventilation, relative to the dangerous methods of heating and ventilating at the State School for the Blind, which methods had been instituted without the plans being submitted to this Board for examination. The Secretary read a letter and extracts from a report of the Board of Control of that institution, which he had received from Mr. Wheat in answer to the above mentioned letter of the Secretary of this Board. Mr. Wheat's communication showed that the change at the school had been made by a previous Board of Control, upon the recommendations of an "expert" on the subject of heating and ventilation. Secretary Baker remarked that he had examined the system now in use, and found it about as bad as it could be. Secretary Baker read his second letter to Mr. Wheat.

[The correspondence, etc., relative to this subject has been collected and printed on subsequent pages of this report.]

The Secretary presented a report which he had received from Dr. C. A. Waldron a veterinary surgeon of Tecumseh, Mich., in which Dr. Waldron gives in detail the results of his experiments with tuberculin, on a herd of Jersey cattle owned by a farmer near Adrian, Mich. No action was taken by the Board. [This report by Dr. Waldron will be found printed on subsequent pages of the Annual Report.]

The Secretary presented and read a circular letter which had been issued and distributed by the Ohio State Board of Health, in which that Board recommends that the Medical Examining and Licensing Boards of the various States be respectfully urged to provide, when permissible, that medical colleges to be considered in good standing shall devote not less than 40 hours to the teaching of hygiene, and require an examination in that branch of medical education. The Secretary asked if this Board could not place before the County clerks an outline of what should be considered sufficient qualifications before recording a diploma or statement of practice which is equivalent to issuing a license for a doctor to practice medicine in the State of Michigan. Dr. Baker thought in that way the standard of Medical Practice in Michigan might be raised, and many of the so called quacks and impostors excluded from practicing medicine in Michigan.

The Secretary presented and read portions of a report of the Columbus Laboratory of Chicago, which purported to show the purity of vaccine points supplied by various firms.

On motion the Board adjourned at 6:00 P. M.

REGULAR QUARTERLY MEETING STATE BOARD OF HEALTH, LANSING, OCTOBER 12, 1894.

Morning Session, at 10:40 A. M.

The meeting was called to order by President Wells; Doctor Gray of Pontiac, Doctor Milner of Grand Rapids, and Secretary Baker were present.

The Secretary read the minutes of the regular meeting, at Lansing, July 13, and they were approved as read.

State Board of Health vouchers numbers 2463, 2466 to 2493, 2496, 2498, and 2511, inclusive, were allowed. However, four accounts were conditionally allowed under the following conditions: The account of the Western Union Telegraph Co., amounting to $17.77, was allowed subject to revision by the Secretary. Dr. McClintock's bill of $25.00 for analyses of two samples of Marine City Water, was allowed conditioned on the inability of the Secretary to secure the amount from the City of Marine City, in whose interest the analyses were made. J. H. MacClure's account of $9.00, for work in connection with moving the store-room, was allowed conditioned on the account not being allowed by the Board of State Auditors, or otherwise provided for. The voucher for postage for use in the Office was allowed in blank, and the President and Secretary were directed to fill in such amount as was left out of this year's appropriation after all the current accounts had been paid, or provided for.

The Board adjourned at 12.00 M. to meet again at 1:30 P. M.

Afternoon Session at 1:37 P. M., October 12, 1894.

At the afternoon session, Doctor Gray of Pontiac, Doctor Milner of Grand Rapids, Doctor Vaughan of Ann Arbor, Prof. Fall of Albion, President Wells of Lansing, and Secretary Baker of Lansing were present, Dr. Henry Sewall, Secretary of the Colorado State Board of Health, was present; and, upon request of the President, addressed the Board with a few appropriate remarks regarding the organization and work of the Colorado State Board, the law for which was modeled after the Michigan law.

Under the head of "Brief Announcement of Business to be brought before the Board" at this meeting:—

Prof. Fall announced that during the meeting he would make a report on the Subject of the Carbonic acid in the atmosphere.

Doctor Milner said he should make a request for the publications of the Office for the Grand Rapids Library Association.

Doctor Vaughan would make his report of attendance at the International Congress of Hygiene, at Budapest.

The Secretary read a list of some fifteen items of business which he would bring before the Board if there were opportunity.

Prof. Fall then presented and read resolutions which he had prepared relative to the death of Dr. Lyster, and they were adopted.*

Dr. Milner stated that some few months ago there was formed in Grand Rapids a Medical Library Association, and it was intended to make a library of medical and sanitary subjects. He requested this Board to

* These resolutions are printed on subsequent pages of this Annual Report in connection with an obituary notice of death of Dr. Lyster.

send to the library association a full set of the Reports and publications of the Office, as far as practicable. The Board granted his request.

As delegate to the International Congress of Hygiene, at Budapest, Sept. 1-9, 1894, Doctor Vaughan said he had not had time to make a written report; but, by permission of the Board he would now make a verbal report, and later would send a written report*.

Doctor Vaughan asked the Board what it wished to do in connection with the Prevention and Restriction of Diphtheria, by the use of immunizing blood-serum. He believed that great progress in our knowledge of this subject, could be made in Michigan by being able to supply health officers and physicians with the immunizing blood-serum.

On motion of Dr. Baker, it was voted that Dr. Vaughan, be requested, if practicable, to enter upon the production of immunizing blood-serum for use in the production of immunity from diphtheria, with a view of still further testing in this country, the efficacy of the method.

The Secretary presented and read portions of his quarterly report of work done in the office during the quarter ending Sept. 30. The report was accepted and placed on file. [The Secretary's report of work in office during the third quarter of 1894 is printed on subsequent pages of this Annual Report.] Dr. Baker presented a certified copy of the opinion of the State Supreme Court in the case of John Hurst vs. Frank R. Warner*.

On motion of the Secretary, the Board authorized the publication of the proceedings of this meeting, and directed that the Supreme Court Decision be printed in the same pamphlet†.

Secretary Baker read a letter which he had received from Dr. Robert Johnston, of Milford, in which Doctor Johnston suggested the question of a disinfectant which shall destroy the germs in a solid dried mass of tuberculous or diphtheritic sputum which had been deposited upon a trunk or the floor.

On motion the Board voted to request Dr. Vaughan to make such investigations as will settle the point whether sulphur fumes will penetrate a dried solid tuberculous or diphtheritic sputum, as it is generally found on a trunk of an immigrant or on the floor; and, if sulphur fumes are not adequate for such disinfection, to test so as to learn just what mode of disinfection is adequate; and that the expense of such investigations be born by the State and audited by this Board.

Secretary Baker stated that in preparing a paper for the Holland Sanitary Convention, Prof. G. J. Kollen of Hope College, had been loaned a number of books from the library, but in some way or other Prof. Kollen had lost Johnson's Chemistry of Common Life (cost $2.00) and Coleman on Alcohol and Narcotics (gift), and asked the Board what they would do with Prof. Kollen's offer to replace the books. Inasmuch as Prof. Kollen lost the books while working in the interest of public health, the Board voted that Prof. Kollen's loan record, as regards the two books mentioned, be canceled, and that the proper record be made on the library loan book.

On suggestion of Doctor Milner, an auxiliary committee on Public-health legislation was appointed, and consisted of the President and Secretary, and Prof. Fall.

* This report by Doctor Vaughan is printed on subsequent pages of this Annual Report.

† Under the head of "The State Quarantine Law" on subsequent pages of this Annual Report will be found the Supreme Court decision.

The subject of the contraction of diphtheria and other diseases by means of public drinking cups was presented, and a communication from Dr. G. W. Goler, medical inspector, board of health, Rochester, N. Y., was read by the Secretary. The Secretary also said: The diphtheria bacillus has been demonstrated on two cups in actual use in a school. The value of public drinking fountains, such as have been in use in New York City, and similar to one in Romeo, Michigan, cannot be over estimated. The cups are stationary on the open end of the water pipe, the water rising in the center and flowing over the edges. When in use the running water continually overflows the sides of the public cup and tends to wash away any infectious material that otherwise collects upon the sides and edges of the cup. Whenever there is a general water-supply with pressure a similar fountain cup might be easily attached to the public drinking place for school children, and it would tend to prevent the spread of diphtheria, and of other diseases of specific origin.

No formal action was taken.

Dr. Milner said he had noticed several instances where school children had probably contracted consumption from their teacher. On his motion, the Board voted to request the committee on public health legislation to frame a bill for the next legislature, which shall prohibit any person from teaching school or acting as a professional nurse without having the certificate from a reputable physician stating that the proposed teacher or nurse is free from any communicable form of tuberculosis.

Doctor Vaughan said it might be of interest to the members of the State Board to know that the method of examination of drinking water carried out at the State Laboratory of Hygiene, is now being quoted as the Michigan Standard.

Prof. Fall thought that the life-saving work of the Office is of the greatest value, and that the statistics and diagrams showing the results of the Board's efforts ought to do much in influencing the next legislature to make an additional appropriation for use of the Board to increase its efficiency.

The Secretary said he feared that if the legislature were asked and made an appropriation for a State Hospital for Consumptives, it may be difficult to obtain additional appropriation for the general purposes of this Board. He said that it might be equivalent to a slight additional appropriation if the State Board of Health Office were to be made by law, one of the Departments of the State Government, and the bills and accounts for paper, stationery, printing, etc., were required to be audited by the Board of State Auditors in the same way as for other Departments.

The subject was referred to the Committee on legislation, with power to act.

Dr. Vaughan suggested that the committee on legislation be requested to frame a law which should prohibit a milkman from selling milk in a city unless he has a license from the State Live Stock Commission showing that his cows have been examined by the State Veterinarian, or a competent veterinarian, and found to be free from tuberculosis, the tuberculin test being applied in case of any doubt.

As committee to whom was referred the subject of the fluctuations in the amount of carbonic acid in the atmosphere, Prof. Fall made a preliminary report on the instruments and apparatus needed to make regular and accurate examinations to determine the amount. The written portion of Prof. Fall's report is as follows:—

At the quarterly meeting of this Board held July 13, 1894, Secretary Baker, as Committee on Climate, etc., presented the subject of the "Decrease of the amount of Carbon Dioxide in the atmosphere," and remarked that some twenty years ago he had asked the Board to authorize a series of regular and accurate chemical analyses of the atmosphere with a view of determining whether there was any change in the amount of the carbonic acid gas in the atmosphere by seasons of the year and by long periods of years. Dr. Baker said that the subject is important now and may become more so, in relation to the public health. He quoted from the *Chemical News*, London, August, 1893, as follows: As evidence that the composition of the atmosphere is still slowly changing, it is stated that "the latest and most careful determinations of carbonic acid in the air have shown a decided decrease (0.05 to 0.03) in the past fifty years."

On the other hand, Dr. Paul C. Freer, Professor of Chemistry in Michigan University, says, in his General Chemistry, just published, that "so far as we know, the amount of carbon dioxide in the atmosphere is not diminishing; if it is growing less the rate of decrease is so very slow that in the short time that chemists have been able to make accurate observations, no change could be noted." He further says: "The amount of carbon dioxide in the air varies slightly, but normally it is about four parts in ten thousand, and it seems that the amount is greater at night than in the daytime, and in summer than in winter. In the higher regions of the atmosphere, where vegetation is impossible, the amount of the gas may increase to eleven parts in ten thousand, while a continued rain may diminish it to two and a quarter."

Prof. Fall further stated that the apparatus needed for the observations would be a standard barometer and thermometer, a burette, and a jar or other receptacle for collecting the samples and conveying them to the laboratory. It ought not to take more than fifteen or twenty minutes to make the observation.*

The report by Prof. Fall was accepted with thanks, and the committee continued.

Dr. Baker was very enthusiastic in his plea that the observations be commenced and continuously made, so that the facts be known and recorded for future use in connection with studies on the causation of disease, with a view to their prevention.

Dr. Vaughan mentioned that there was at Montsouris in France a laboratory where the observations had been taken and recorded for the last fifty years.

On motion of Dr. Baker it was voted that there should be a special meeting of the Board during the interval between the sessions of the Union City Sanitary Convention, and also one during the Charlotte Convention.

On motion, the Board adjourned at 5:15 P. M.

SPECIAL MEETING, AT CHARLOTTE, NOV. 22, 1894.

A special meeting of the Board having been called by the president to meet during the intervals of the sessions of the sanitary convention, the Board met in the parlors of the Hotel. Members present were Hon. Frank Wells, president, Lansing; Victor C. Vaughan, Ann Arbor; Prof. Delos Fall, Albion, and Secretary Henry B. Baker, of Lansing. Prof. Fleming Carrow, of Ann Arbor, and Doctor C. H. McKain, of Vicksburg, were present at the meeting.

State Board of Health vouchers numbers 2500 to 2507, inclusive, were allowed.

* [But this does not seem to provide for supplying the information contemplated by Dr. Baker—as set forth on page 297 of the "Fourth Registration Report"—Vital Statistics of Mich., 1870.]

There was an informal discussion of measures relating to the public health which the State Board might present to the next session of the legislature. This discussion related more especially to the proposed State Hospital for Consumptives. All persons present joined in the discussion. It was agreed that about sixty or sixty-five thousand dollars ought to be asked for with which to construct a State Hospital for Consumptives.

REGULAR MEETING AT LANSING, JANUARY 11, 1895.

The meeting was called to order by President Frank Wells, Prof. Delos Fall, Doctors Vaughan, Gray, Milner, Granger, and Secretary Baker were present.

The Secretary presented and read the minutes of the regular meeting, Oct. 12, 1894. The minutes were approved by the Board.

On motion of Doctor Baker, it was voted that the written report of Doctor Vaughan, as delegate to the meeting of the International Congress of Hygiene and Demography, at Budapest, Sept. 1-9, 1894, be printed in the Annual Report.*

The reading of the minutes of the Charlotte meeting of the Board, was postponed until the next regular meeting of this Board.

As special committee to report to the Board the advisability of entering upon the production of immunizing blood-serum for the use in the production of immunity from diphtheria, with a view of still further testing in this country, the efficacy of the method, Doctor Vaughan spoke somewhat as folows:—I have given the subject considerable attention, and found that the expense would be too great for the State Board of Health to undertake. A few weeks later Parke, Davis and Co. came to me and asked my advice relative to the production of the antitoxine. They requested me to take charge of the work, but I recommended Doctor McClintock and they employed him. They are starting out with fifteen horses. The expense of the horses and their care is considerable. It is costing $15 per month for the care of each horse. I think it unfortunate that it is impracticable for the Board to undertake the work.

Suggestions were made for securing an appropriation for the work in connection with antitoxine. Doctor Vaughan further reported that New York City had undertaken the production of the antitoxine. Forty horses were being treated (immunized), and it would probably cost the city $30,000 before the blood-serum could be obtained.

Doctor Vaughan suggested that a committee might be appointed to examine samples of antitoxines offered for sale in Michigan.

Doctor Baker stated that such action by the Board would not be in accord with views held by former members of the Board. He believed it out of the line of work this Board should pursue; it relates to a line of treatment, which this Board has been very careful not to undertake in any disease. If we were to undertake the analysis of one drug or medicine, there are many which we would be expected to analyze, and that comes under the jurisdiction of another Board, or Commission.

Doctor Baker read a letter which he had received from Erwin F. Smith, a former employe of this Office, relative to the new treatment of diphtheria recommended by Doctor Löffler. Dr. Baker said: It seems to me if the treatment (local) which Doctor Löffler recommended kills the

* Printed on subsequent pages of this report.

germ before it has opportunity to produce its toxine, there would be no use for the anti-toxine. It would be much more appropriate for this Board to continue along the line in which it has been working for the restriction of diphtheria, namely: Isolation and Disinfection. It would be of importance in the restriction of diphtheria to secure a State law which would prevent the introduction of a dangerous disease into a locality.

Doctor Vaughan thought the examination of samples of antitoxine would not in any way interfere with the restriction of diphtheria, and would tend to aid in that line of work.

On motion of Doctor Granger, the Board voted to appoint Prof. Victor C. Vaughan, M. D., Director of the Michigan State Laboratory of Hygiene, a special committee to test the immunizing properties of samples of Antitoxine offered for sale in Michigan.*

Doctor Vaughan reported that the work in connection with the question of a disinfectant which shall destroy the germs in a solid dried mass of tuberculous or diphtheritic sputum was in progress and that he would make a complete report at some future meeting.†

State Board of Health vouchers numbers 2494, and 2512 to 2530, inclusive, were allowed.

Doctor Gray came in at 10:55 and took his seat as a member of the Board.

The president announced that the Governor had requested that the Board meet with him, and if agreeable to the other members he would make arrangements to meet with the Governor at 2:00 P. M.

Secretary Baker presented his quarterly report of work during the preceding quarter; but, as there was not much time at the disposal of the Board, the reading of the report was dispensed with.

On motion of Doctor Granger, the Secretary was directed to publish an abstract of the proceedings of this meeting, in pamphlet form.

On motion of Doctor Baker, the following preambles and resolutions were adopted and referred to the Committee on Mortality and Sickness Statistics:—

WHEREAS, An accurate and prompt registration of the deaths and the causes of deaths in each locality of this State would be of very great practical usefulness to the work of this Board, and consequently of great value to the people of Michigan, and

WHEREAS, Under the present law, which has not been amended since 1869, the registration of vital statistics has failed to give accurate results, and to present them sufficiently early to be of the greatest practical sanitary use and public interest; therefore

Resolved, That the Michigan State Board of Health earnestly recommends the enactment of an improved law for the registration and return of deaths (and also of births), which shall provide for their immediate record, and prompt report to the State Department.

Resolved, That a committee be appointed by this Board to present the subject to the Legislature, and to urge such action; said committee to act independently or in conjunction with similar committees of the Michigan State Medical Society, Michigan Academy of Science, or other organizations, as may be deemed advisable.

* [In a letter dated March 9, 1896, Dr. Vaughan said: "We have tested on guinea-pigs several samples of all the different makes of antitoxin which have been offered for sale in the State of Michigan. When antitoxin first appeared in this country, some of these samples were not up to the standard. Now, however, we find that all are reliable. It will probably be just as well not to mention the names of the makers."]

† [In a letter dated March 9, 1896, Dr. Vaughan said: "The experiments upon tuberculous and diphtheritic sputum were begun a year ago, but on account of press of work this investigation was never finished."]

The Secretary presented a set of circulars, blanks, etc. relative to the restriction of tuberculosis, and the bacteriological examination of tuberculous sputum by the Rhode Island State Board of Health.

The Secretary presented Doctor Hauxhurst's written report of the special investigation of the outbreak of diphtheria in Huron Co. [Printed on subsequent pages of this Report in connection with the report on "Diphtheria in Michigan in 1894".]

The account of Robert Smith & Co., for printing, binding, etc., amounting to $285.70 was allowed.

The Secretary presented a copy of the memorial to the legislature of the Second Annual Conference of Michigan Health Officers for the establishment of a State Hospital for Consumptives. Also a similar memorial in the form of resolutions adopted by the Union City Sanitary Convention, for presentation to the legislature.

The Secretary presented and read a letter which he had received from Doctor Benjamin Lee, Secretary Penn. State Board of Health, relative to the ignorance of physicians of the signs and symptoms of small-pox.

Doctor Vaughan, the committee to whom was referred the subject of suspected poisoning by dried beef, at Somerset Center, Hillsdale Co., reported that he had examined the dried beef, and found it contained a capsulated bacillus which when injected into white rats and guinea pigs promptly killed them, showing that it was a poisonous germ. [His written report will be found printed on subsequent pages of this Annual Report.]

Doctor Vaughan also reported relative to suspected poisoning by pressed chicken at Sturgis, Michigan. During a banquet some 200 persons were poisoned. A sample of the chicken was examined at the State Laboratory of Hygiene, and found to contain a short capsulated bacillus which was poisonous, but not of such a virulent character as the one found in the dried beef. It was found, by inoculation, that the germ would kill guinea pigs, but did not kill rats.

Doctor Granger, Committee on Public Health Legislation, reported that he had not prepared any bills for presentation to the legislature. He presented a Massachusetts Act for the suppression of Contagious Diseases in Animals, and said he thought there should be enacted in Michigan a law or laws covering about the same ground. He thought there should be two bills, and said he would do all in his power to have bills passed. He thought there should be a State inspection of cattle, and a provision for a State Milkman's License.

Doctor Baker said: At the Stanton Sanitary Convention Mrs. Hinds read a paper, and I then came to the conclusion that, so far as relates to the restriction of tuberculosis, the State Live Stock Commission lacks "the other blade of the scissors," and this other blade is inspection, and reports to the State Live Stock Commission. I think Dr. Granger's suggestion a valuable one.

Doctor Milner thought it was an expense the people would not warrant.

Doctor Gray said he had talked with a number of farmers, and they were interested in the importance of the restriction and prevention of tuberculosis, and he believed would warrant any reasonable expense which would protect the people and the live stock from tuberculosis.

The Secretary read the resolution which was adopted at the Second Annual Conference of Health Officers, relating to a milkman's license,

and said the President of the Agricultural College suggested that the resolution should read after the words "State Veterinarian" "or a competent veterinarian approved by the State Live Stock Commission", etc.

On motion of Doctor Baker, the Board voted to direct the Committee on Legislation, to confer with members of the State Live Stock Commission and the State Veterinarian, to prepare bills for the improvement of the sanitary laws of the State relative to live stock, and to look to the introduction and passage of such bills.

On motion of Prof. Fall, it was voted to direct the committee on schools, to prepare a bill for introduction in the Legislature, which shall regulate the employment of teachers in our public schools, and professional nurses, who are affected with any communicable form of tuberculosis. This action to take the place of any previous action of the Board conflicting therewith, or on this subject.

The Secretary presented the proposed bill, with amendments, for the establishment of a State Hospital for Consumptives.

On motion the Board adjourned at 12:15 to meet again at 1:15 P. M.

SECOND SESSION, AT 3:30 P. M.

On account of the extended meeting with the Governor, the Board did not convene until 3:30 P. M. President Wells, Doctors Vaughan, Gray, Milner, Granger, Baker, and Prof. Fall were present.

The proposed bill and amendments for the State Hospital for Consumptives were again presented. The bill was read section by section, amended, and approved.

[At the special meeting of the Board, Feb. 1, 1895, the Bill for the Hospital for Consumptives, was further amended. The Bill as amended and presented to the Legislature is printed in connection with the proceedings of the special meeting of this Board, Feb. 1,1895.]

On motion of Doctor Vaughan, it was voted that the Committee on Legislation, Dr. Granger, be instructed to prepare an amendment to Act 47, laws of 1893, in accordance with the Governor's wishes, and report the proposed amendment to the Secretary who will have copies hektographed and sent to each member for suggestions.

On motion of Doctor Vaughan, it was voted that an auxiliary committee on public-health legislation be added to the Committee on Legislation for conference with the State Live Stock Commission, and the preparation of the bills relative to the improvement of the sanitary laws relative to live stock.

Discussion was had regarding the rules of the Office. It had been alleged that they had not all been complied with by clerks. Doctor Vaughan moved to appoint a special committee consisting of President Wells, Prof. Fall and Doctor Milner to investigate the work of the office, with special reference to the enforcement of the rules. Doctor Baker thought this unnecessary because a similar committee had recently reported relative to the work of the Office. Doctor Vaughan then changed his motion to make President Wells a special committee to coöperate with the Secretary in the enforcement of the rules of the Office. Doctor Baker asked how it would do to have the rules read before the full Board, and if correct approved, if not correct amended, and when

correct the Secretary directed to have them fully complied with. He said a division of authority led to difficulty in the work of the Office; recently a clerk had questioned the authority of the Secretary and talked of appealing from his decision; the clerk had been told that he must do what the Secretary directed, or be discharged. He deprecated division of authority, and thought that, if necessary, the Board should discipline the Secretary, and the Secretary alone should discipline the clerks.

As members were anxious to catch their train, action was deferred, but it was understood that at a special meeting, soon to be called, the rules were to be read, amended if necessary, and then enforced.

On motion the Board adjourned at 4:55 P. M.

SPECIAL MEETING, AT LANSING, FEB. 1. 1895.

The meeting was called to order by President Frank Wells, and Prof. Fall, Doctors Gray, Milner, Granger, and Baker were present.

The president stated that the meeting had been called for the purpose of considering proposed public-health legislation,* and such other business as might properly come before the Board at this special meeting.

On motion of Doctor Baker, the vouchers of members for expenses in attending the special meeting were allowed subject to the certificate of each member and countersigned by the President and Secretary.

The Secretary read a list of some eighteen items of business he wished to bring before the Board if there were opportunity.

Dr. Granger, Chairman of the Committee on Legislation, reported that he had prepared the proposed amendment to Act 47, laws of 1893, and sent his proposal to the Secretary who had made some additions. Dr. Granger, had nothing further prepared, but had under consideration a proposed amendment to the food laws.

Secretary Baker thought that the improvement of the food laws should be left to the Food Commissioner, that this Board had considerable public-health legislation to which it ought to devote most of its attention.

It was proposed that the amendment to Act 47, laws of 1893, should stand as section eight; but, after considerable discussion it was thought best to not amend the act, but to make a new act which should provide for the enforcement of the public-health laws in cases where local authorities failed to act, as suggested by the Governor, and a proposed bill, with the following title, was finally approved by the Board:—

A BILL to provide for the enforcement of the public-health laws in townships, cities and villages when local authorities fail to act.

On motion of Prof. Fall, it was voted that President Wells and Secretary Baker be a committee to place before the Governor and Attorney General, the proposed bill with the foregoing title, and to take immediate action for its passage.

Having complied with the Governor's wishes for a provision for the enforcement of public-health laws, the subject of amending Act 47, laws of 1893, in order to make the law constitutional, was presented.

Secretary Baker thought that Rule 1 of the Rules for the Inspection of Immigrants and Travelers, might be incorporated in the act as a new section. Prof. Fall thought that Section 6 might be amended to provide for

* For details regarding the public-health legislation see subsequent pages of this Report,—"Public Health Legislation and proposed legislation in Michigan in 1895."

the State Board of Health going into any locality and doing whatever it deemed best for the restriction and prevention of dangerous disease.

On motion of Doctor Baker, Dr. Gray was appointed a committee to prepare an amendment to Act 47, laws of 1893, send the amendment to the Secretary; the Secretary to send the amendment to the members of the Board, and, if approved, place the subject before the attorney general, and look to the passage of the bill. [A copy of this proposed amendment to Act 47, laws of 1893, was placed in the hands of the Governor, and also in the hands of Attorney General Maynard. Although numerous requests were made upon the Attorney General for a report upon the Constitutionality of the proposed Bill nothing was ever heard from him on the subject.]

On motion the Board took a recess from 12:15 M. to 1:00 P. M.

Afternoon Session, Feb. 1, at 1:12 P. M.

The meeting was called to order by President Wells, and Prof. Fall, Drs. Gray, Granger, Milner and Baker, were present.

The Secretary presented a bill proposed by Mr. Wells, amendments proposed by Doctor Vaughan and Prof. Fall, also a bill which the Secretary had drawn, all relating to the auditing and payment of bills of the Office of the Secretary for postage, printing, binding, etc. The proposed bill which "for the purposes of the act" was to recognize the Office of the Secretary of the Board as the "Department of Health," of the State Government, was not favorably received, the members thinking they did not in any way wish to suggest a change in the name of the Office. There was some discussion as to what would be the best way to word the bill.

On motion of Doctor Baker, a bill bearing the following title was adopted:—

A BILL to provide for the auditing and paying of bills for expenditures for the Office of the Secretary of the State Board of Health.

The Secretary presented and read a bill which had been prepared by Prof. Fall, and which provided for an increased appropriation for use in holding sanitary conventions, etc. The bill was approved by the Board. The title is as follows:—

A BILL to amend section one of act number two hundred and forty-one of the public acts of eighteen hundred and eighty-one.

The Secretary presented and read a bill which he had prepared providing for the teaching in schools the best measures for the restriction and prevention of the dangerous diseases. Prof. Fall thought that the specific penalty should be omitted, and there should be substituted in its place the last two sentences in section 5067 Howell's Statutes (Supplement). Section one of the bill, as read by the Secretary, was approved, and section two was amended to conform with suggestions by Prof. Herdman and Prof. Fall. The bill was approved as amended. The title is as follows:—

A BILL to provide for teaching in the public schools, the modes by which the dangerous communicable diseases are spread, and the best methods for the restriction and prevention of such diseases.

The Secretary presented and read a bill which had been prepared by Prof. Fall and which provided for Communicable-Disease Inspectors.

There was some discussion, and the bill was approved as read. The title is as follows:—

A BILL to provide for the employment by the State Board of Health of one or more Communicable-Disease Inspectors.

The Secretary presented and read a bill which had been prepared by Doctor Milner and which provided for the medical examination of teachers and nurses. The bill was slightly amended and approved. The title is as follows:—

A BILL to require of each school teacher a physician's certificate of freedom from dangerous communicable disease, in order to protect the pupils in public and private schools from exposure to such diseases.

The Secretary presented the bill for the State Hospital for Consumptives, and read the letter from Doctor Vaughan suggesting that the location of the Hospital shall be in or near Ann Arbor. The Secretary also read letters which he had received from Regents Barbour, Fletcher, Hebbard, and Kiefer.

Prof. Fall said he did not like the tone of the replies which had been received from the regents. Large sums of money were annually appropriated for the University for educational purposes, and they were eager to get more; but here was something which dealt with the health and life of the citizens of Michigan, and the Regents did not seem inclined to favor the movement. He believed this Board should go right along and try to get the appropriation, and then ask the Board of Regents to comply. If the Board of Regents works against the bill, he believed we should antagonize the other appropriations for the University. The title of the bill was read and approved, as follows:—

A BILL to establish a State Hospital for Consumptives, and to make an appropriation therefor.

The Secretary read the latest hektograph copy of the bill, which was considered section by section and a number of changes made.

On motion the bill was adopted as amended, and the Secretary was instructed to rearrange the numbering of the sections as he thought best. The bill as finally amended and presented to the legislature is as follows:—

A BILL to Establish a State Hospital for Consumptives, and to make an appropriation therefor.

SECTION 1. *The People of the State of Michigan enact*, That there shall be established in connection with the University of Michigan, in or near the city of Ann Arbor, a hospital to be known as "The Michigan State Hospital for Consumptives."

SEC. 2. The objects of said Hospital shall be: (1) the proper care and treatment of persons having the disease known as consumption, phthisis or tuberculosis, in order that the spread of this disease may be lessened; (2) the training and education of persons who shall go out from that hospital, in the best methods for restricting the spread of this dangerous disease; (3) the training, in such methods, of medical students who are to practice medicine in Michigan, so that they may know how to restrict tuberculous diseases; and (4) that physicians and others may be enabled to study this disease under favorable conditions, thereby obtaining knowledge useful for the prevention of the spread of this disease, and for its ultimate restriction or extinction in Michigan.

SEC. 3. The State Board of Health shall prepare and adopt plans for the grounds, buildings, and fixtures for such hospital, of such form, style and dimensions as will when completed come within the sum by this act appropriated for that purpose; and the said State Board of Health is hereby constituted a building commission empowered to erect and equip the same.

SEC. 4. The State Board of Health shall have power to appoint an architect, superintendent and other necessary agents and assistants, and to fix their compensation, subject to the approval of the Governor.

SEC. 5. The general supervision and government of said State Hospital for Consumptives, shall, as soon as the building is finished and equipped, be vested in the Board of Regents of the University of Michigan; and the State Board of Health is hereby directed to pass into the hands of said Board of Regents the building, grounds, and equipment, as soon as the same shall be ready for occupancy. The Board of Regents shall annually pay into the hospital fund any surplus of receipts over the expenditures of such hospital, such funds to be used for the enlargement and extension of the hospital.

SEC. 6. The Board of Regents are hereby directed and empowered to establish such by-laws and general rules as they may deem necessary for regulating the appointment and duties of officers, attendants and assistants, for fixing the conditions of admission, support and discharge of patients, and for conducting in a proper manner the business of the hospital, also to adopt and enforce a suitable system of rules and regulations for the discipline and management of the hospital. To this end, the requirements for the advice of the State Board of Health provided for in Section 2 of Act 81, Laws of 1873, shall be hereby extended so as to include the subjects of this section and of this act.

SEC. 7. The Board of Regents shall appoint a Medical and Surgical Staff consisting of five members, of which the Professor of Hygiene and Bacteriology shall be one, and the said staff shall have the general management of the hospital, and the direction and control of all persons therein, subject to the State laws and to the regulations established by the Board of Regents. The staff shall nominate a general superintendent, house physician and such other officers and assistants as are necessary, and shall have power to assign them to their respective duties in a manner directed by the by-laws. The House Physician shall keep himself constantly informed with respect to the condition of all the patients, and shall, under the direction of the staff, have the general direction of their treatment. The staff shall see that no patient suffers for lack of medical care, nurses, food or other necessary; they shall cause full and accurate accounts and records of all patients and of all the transactions of the hospital, whether sanitary, medical or financial to be kept regularly, from day to day, in books provided for that purpose; they shall make an annual report to the Board of Regents of all matters pertaining to the operations of the hospital; they shall also annually report to the State Board of Health all matters pertaining to the particular results for which the hospital is established.

SEC. 8. The sum of sixty thousand dollars is hereby appropriated, out of the general fund in the State Treasury, for the purpose of carrying into effect the provisions of this act; also the further sum of four thousand dollars per annum, or so much thereof as shall be necessary, to defray the current expenses of said hospital.

SEC. 9. There shall be assessed upon the taxable property of the State, in the year eighteen hundred and ninety-five the sum of sixty thousand dollars, and in the year eighteen hundred and ninety-six the sum of four thousand dollars, which sums shall be assessed, levied and collected in the same manner as the State taxes are assessed, levied and collected, and which taxes, when collected shall be credited to the general fund, to reimburse the same for the amount drawn therefrom as provided in Section 6 of this act.

SEC. 10. Nothing in this act shall prevent a patient in this State Hospital for Consumptives from being treated in accordance with the wishes of said patient by any physician legally authorized to practice medicine in Michigan: *Provided* that such treatment, except that regularly provided for, shall not be at the expense of the State, and that nothing connected therewith shall conflict with the general rules established by the Board of Regents of the University for the proper government of the Hospital and grounds.

SEC. 11. There shall be received into said hospital, such persons as shall be proved by proper bacteriological examination to be suffering from tuberculosis. Such patients shall be of two classes, namely, first, persons, residents of this State who on account of their poverty are unable to pay the necessary expenses for residence at said hospital, and second, residents of this or any other State who are able to pay such fees as shall be fixed by the Board of Regents.

SEC. 12. In the case of the persons named in Sec. 11 under the first class, after such persons shall have furnished a certificate of the superintendent of the poor of their county or township, the Board of Regents shall have discretionary power to pay their necessary expenses, not exceeding ——— dollars per annum, and for that purpose may issue a certificate, directed to the auditor general that such stated amount is necessary for the benefit of such individual, whereupon the auditor general shall draw his warrant on the State Treasurer therefor; and any such sums are hereby appropriated, and shall be paid out of any moneys in the general fund not otherwise appropriated, and the auditor general shall charge all such money to the county of which such person is a resident or to which he or she belongs, to be collected and returned to the general fund as any State taxes are required to be by law.

SEC. 13. Any superintendent of the poor, in any county of this State, may send, or cause to be sent, any person who, under the rules of the hospital, is entitled to admission therein, who is a charge upon the county. Before sending any patient to the hospital, under the provisions of this act, such superintendent of the poor shall correspond with the superintendent of the hospital, and conform to the rules established by the Board of Regents, and he shall cause the patient to be comfortably clothed, and shall provide the patient with suitable clothing while the patient remains at the hospital, and shall defray the necessary traveling expenses in going to and returning from the hospital, and provide the patient with such articles of necessity and convenience as are required by the rules of the hospital.

SEC. 14. All persons entitled to admission to the hospital who are not a charge upon any county, but who, on account of their poverty, are unable to provide themselves with proper clothing or other necessary articles shall receive the same aid from the superintendents of the poor of their respective counties while attending the hospital as is provided in this act for those who are a county charge. All proper expenses incurred by the superintendents of the poor under this section shall be a charge against their respective counties, and shall be defrayed out of the poor fund of such county.

On motion of Dr. Baker it was voted to authorize the Secretary to supply Mr. MacClure two hundred and fifty copies of the reprint of Mr. MacClure's paper on Rabies.

Prof. Fall (at 2:35 P. M.) left in order to take the train for Jackson.

The Secretary mentioned that one clerk had refused to comply with the rules of the Office; and, when told that any clerk who expected to remain in the Office must comply with the published rules, saw fit to hand in his resignation to take immediate effect, and the resignation was accepted. The Secretary said that in this particular instance, Mr. Gongwer had refused to show visitors having business with the Office into the Secretary's room, and if the Secretary was not there to introduce them to the Correspondence Clerk as the rules provided; instead of complying, he had demanded that the Correspondence Clerk be removed.

The Secretary presented a copy of the "Second Edition" of the rules of the Office. He stated that a copy had been sent each member, and inquired whether or not any member had amendments or suggestions to make. Some members had not received the copy before leaving; no amendments were offered to the rules.

The members expressed the view that the rules should be strictly enforced, and that any clerk refusing to obey them should be immediately discharged, and that any such clerk once out should not be taken back.

The Secretary presented the application of Eli Bidleman for a clerkship.

The subject was discussed but no action taken.

Dr. Milner left (at 3:05) to take a train for Grand Rapids.

The Secretary presented a letter, from Dr. R. H. Stevens of Detroit, relative to the regulation of the sale of poisons.

On motion the Board adjourned at 3:10 P. M.

SPECIAL MEETING AT LANSING, MARCH 13, 1895.

Morning Session, 11:00 A. M.

The special meeting was called to order by President Wells, at 11:00 A. M. The following named members were present: Hon. Frank Wells, Lansing; Prof. Delos Fall, Albion; Mason W. Gray, M. D., Pontiac; Samuel G. Milner, M. D., Grand Rapids; and Dootor Henry B. Baker, Secretary, Lansing. (Dootor Vaughan was present at the afternoon session.)

President Wells said that the meeting had been called for the purpose of considering proposed public-health legislation, and transacting such business as might properly come before the Board, including the auditing of accounts. The President said that the use of the Legislative Hall had been granted, for this evening (March 13) for the purpose of listening to Prof. Vaughan, of the University, and other members of the Michigan State Board of Health on the subject of proposed public-health legislation. Mr. Wells expressed the hope that as many members as possible would remain to attend the public meeting.

On motion of Doctor Baker, it was voted that the vouchers for expenses of members in attending this special meeting, be allowed, subject to the certificate of each member incurring expense.

On motion of Dr. Baker, the regular order of business was suspended.

On motion of Doctor Baker, it was voted that Prof. Vaughan be authorized to represent the Board, in his address before the public meeting in the Legislative Hall, this evening.

On motion of Doctor Baker, it was voted that Prof. Fall also should represent the Board at the public meeting.

On motion of Doctor Gray, it was voted that President Wells also represent the Board at the public meeting.

It was also understood that the Secretary or other member should respond to any questions which might be asked them.

The Secretary spoke, at considerable length, on the resources and expenditures of the Board, remarking that he thought it exceedingly important that each member have "at his tongue's end" the facts on those two points.

President Wells presented and read a letter which he had received from Prof. Frank Kedzie, in which Prof. Kedzie requested the loan of the Thompson's quadrant Electrometer.

On motion of Doctor Baker, it was voted that Prof. Kedzie be granted the use of the Thompson's quadrant Electrometer, on the conditions named in his application, provided he will report any results he might obtain to the Office of the Secretary of the Board; his application to be placed on file in the Office of the Secretary.

President Wells said that the Board was being attacked by Mr. Gongwer, an ex-clerk of the office, who claimed that he left the office because he could not do the work that was crowded upon him. He said Mr. Gongwer had told the Secretary he would not take up the work in connection with consumption, and had complained to the President who persuaded Mr. Gongwer to attempt the work.

The Secretary stated that Mr. Gongwer came back to the Secretary and intimated that he would take up the work, but Mr. Gongwer had done very little with that disease, and after he left, 68 reports of the presence of consumption in as many localities in Michigan were found neglected on his table. Although Mr. Gongwer claimed he had been overworked, another clerk immediately took up the work, and not only did what Mr. Gongwer had neglected and what he had done, but additional work.

Doctor Milner mentioned that a citizen of Grand Rapids had complained to him that on account of the State Board of Health, he could not bring the body of his child, dead from diphtheria, from Laporte, Indiana, to Grand Rapids, Michigan. Secretary Baker explained that it was a rule of the General Baggage Agents Assoc., that prevented the body being transported on the railroad. The Secretary also mentioned that the rules had been approved by the State Board of Health, and he did not believe it policy for the State Board of Health to take down any safe-guard for the public-health that the General Baggage Agents Assoc., had put up, for the protection of their employees and the citizens of Michigan. But it is not action by this Board which prevents taking a diphtheria corpse by rail.

The Secretary mentioned that he had been informed by a Representative in this Legislature that a lawyer representing a railroad in the Upper

Peninsula was around the Legislature claiming that the Board, by its work under the State quarantine law, had ruined the business of the Upper Peninsula, and of the railroads in the Upper Peninsula, and kept immigrants from that part of the State, all on account of silly rules which accomplished nothing; and that the Supreme Court had decided that the Board was wrong. The representative having asked what reply could be made to this attack, the Secretary said he had replied that the legislature of 1893 had passed a State quarantine law, probably induced to do so by the prevalence of cholera in Europe, and the fact that the uniform experience in the past has been that when cholera was prevalent in Europe it has finally been brought to this country. It was the duty of the State Board of Health to enforce that law. The State Board had tried to do so; and, for that purpose, had made rules which the circumstances required, and without which there was no probability of keeping out the diseases specified in the law. The Supreme Court has decided that the law is constitutional, but that the rules were not authorized by the law, which, under the circumstances is equivalent to a statement that the law is not useful for one of the purposes for which it exists—namely to prevent the introduction of disease by immigrants.

On motion the Board took a recess from 12:30 to 1:30 P. M.

Afternoon Session at 2 P. M.

Mr. Wells, Prof. Fall, Doctors Vaughan, Gray, Milner, and Baker were present. (Doctor Vaughan had arrived in the city during the recess.)

President Wells explained, for the benefit of Doctor Vaughan, the proceedings of the Board during the forenoon session.

Prof. Vaughan read a list of headings which were to serve as memoranda or notes from which he was to speak in the evening.

No formal business was transacted, but the time was occupied by the members agreeing on just what points each speaker for the evening should consider, and in comparisons of views on sanitary subjects and on proposed public-health legislation.

On motion the Board adjourned at 3:20, subject to the call of the President.

(Doctor Granger arrived at 3:30.)

REGULAR QUARTERLY AND ANNUAL MEETING AT LANSING, APRIL 12, 1895.

The meeting was called to order at 10:30 A. M., but, as President Wells, Prof. Fall and Doctor Baker were the only members present, no quorum was present.

A telegram from Doctor Vaughan announced that he would not be able to attend because of the death of a friend.

A recent letter from Doctor Gray stated that he had been sick, and would probably not be able to attend the meeting.

A recent letter from Doctor Granger stated that "We are having very many cases of influenza here and many sick," and that he would probably not be able to attend.

On motion of Prof. Fall, the Board adjourned subject to the call of the President.

Doctor Granger came in at 11:00, and the Board was called to order by the President.

On motion of Prof. Fall items 2, 3 and 4 of the order of business were suspended, and the order of "Communications by the President" was taken up.

President Frank Wells read the following statement and recommendation:—

"It seems proper that I should call your attention to charges made by members of the present legislature concerning the members of this Board during the recent discussion of the bill now before the legislature known as the Miller bill.

"These charges affect not only the business and professional character of the members of this Board but also their integrity. In my opinion self-respect demands that we request of the House of Representatives that it appoint a Committee for the purpose of thoroughly investigating these charges, to the end that proper remedies may be applied should all or any of them be sustained."

On motion of Doctor Baker, the following preamble and resolution, drafted by Prof. Fall, were unanimously adopted:—

WHEREAS, Serious charges have been made on the floor of the House of Representatives, reflecting on the business and professional character, as well as the integrity, of the members of this board, therefore

Resolved, That this Board respectfully and earnestly requests the honorable, the House of Representatives, to appoint a committee to investigate the above-mentioned charges, and that the committee be authorized and directed to make a thorough investigation of all the acts of this Board.

The above preamble and resolution were placed in the form of a letter to the Speaker and House of Representatives, signed by the President and Secretary, and sent to the Speaker.

Doctor Granger said that there seemed to be some misunderstanding relative to his position regarding the hostile legislation against the State Board. He remarked somewhat as follows:—Governor Rich wished me to draw a bill which would make some changes in the law under which the Board is now operating, and fix it so the Secretary would not be a member of the Board, and so the Governor would be *ex-officio* member, and make the term of Office of the Secretary two years, the Secretary being eligible to re-appointment. I am not in favor of the so-called Miller Bill, as I stated to the Secretary in a recent letter to him. The Governor is not in favor of the Miller Bill, but is in favor of the bill drawn by me and introduced in the Senate by Mr. Bialy of Bay City. (Senate Bill No. 329, File No. 247.) I believe that the Bialy bill should pass, and I believe the other members of the Board will agree with the Governor and with me. I believe that such a change would do away with so much opposition as the Board now receives. There is a very strong feeling that such a law should pass. The belief is widespread that the Secretary has too much influence with the actions of the Board, and that there is a "one man power". I feel kindly toward the Board, and want to see its work on just as good a footing as possible, but I believe the above-mentioned changes are demanded and will be made, and do away with opposition in the future.

Dr. Granger secured and read a few extracts from the Bialy bill.

Dr. Granger said he had, some six weeks ago, received a letter from Mr. Gongwer, which he would read to the Board. He read the letter,

which requested that he (Dr. Granger) come to Lansing and help to pass the Miller Bill, etc.

In this connection Secretary Baker said that within the last two days Mr. John Davis, of Detroit, had come to the Office, and told Mr. MacClure, that he had received a letter from Mr. Gongwer, requesting him (Mr. Davis) to come to Lansing and help pass the Miller Bill. To compensate Mr. Davis for his trouble, Mr. Gongwer offered to help Mr. Davis to defeat the pure food bill or bills. Mr. Davis is a dealer in spices, baking powders, etc. Mr. Davis told Mr. MacClure that he would send Mr. Gongwer's letter to Secretary Baker.

At 11:05 Doctor Milner telephoned that his business would not permit him to attend the meeting. When asked by telephone if he favored the resolutions relative to an investigation, he said "I approve the action of the Board."

Doctor Granger reviewed that portion of the Miller Bill which related to members being Communicable-Disease Inspectors, and said that he did not favor it, because there were localities in his district that he could not investigate inside of four or five days and could not under the Miller Bill receive to exceed $30.00 for any one investigation. He said that a man with as much practice as the professional members had, could not be expected to make such investigations. He suggested that the Bialy bill could be made to amend the law so that investigations could be made by any "member, Secretary or other suitable person" and that the expenses should come out of the quarantine fund. He thought such a provision could be easily made, and would receive no objection.

On motion the Board adjourned at 12:15 to meet again at 1:30 P. M.

Afternoon Session.

The Board was called to order at 2:00 P. M. and President Wells, Prof. Fall, Doctor Granger, and Secretary Baker were present.

On motion of Doctor Granger, the Board voted to dispense with the reading of the minutes of the last regular meeting, and those of the special meeting at Lansing, March 13, 1895.

State Board of Health vouchers numbers 2532 and 2549 to 2568, inclusive, were considered and allowed.

Secretary Baker read a brief announcement of some twenty items of business which he wished to bring before the Board, if there were opportunity.

The Secretary handed to each member a copy of a communication which he had received from Dr. Probst, Secretary of the Ohio State Board of Health, with which Dr. Probst transmitted a letter which he had received from Casper Sacks, meat inspector at Toledo, Ohio, and an opinion by the Attorney General of Ohio, all relating to diseased meat that had been offered for sale in Toledo, but which had been sent there from Coldwater, Mich.

This being the annual meeting, an address by the President was in order.

President Wells said that together with his personal business, and his efforts with the Legislature, and the fact that he had been suffering with la grippe, he had not had time to prepare the address that he had intended to make. However, he had put a few remarks on paper, and would read them. His address was substantially as follows:—

THE ADDRESS OF THE PRESIDENT OF THE MICHIGAN STATE BOARD OF HEALTH, AT ITS ANNUAL MEETING IN THE CAPITOL, LANSING, APRIL 12, 1895.

BY HON. FRANK WELLS, PRESIDENT.

To the Members of the State Board of Health—Gentlemen. On the 12th day of April, 1873, just twenty-two years ago to-day, the bill organizing the Michigan State Board of Health was approved. The provisions of this bill which became a law of the State on that day have never been changed. The law is liberal and comprehensive and fairly states the objects sought to be secured by the creation of a State Board of Health, so far as sanitary knowledge and experience had, at the time of its enactment made these objects manifest. The newly created board was given general supervision of the interests of the health and life of the citizens of this State. It was required especially to study the vital statistics of the State and endeavor to make intelligent and profitable use of these records. It was made its duty to make sanitary investigations and inquiries respecting the causes of disease and especially of epidemics, also the causes of mortality and the effects of localities, employments, conditions, ingesta, habits and circumstances on the habits of the people. It was authorized when required or when it might deem it best to advise officers of the Government or other State Boards in regard to the location, drainage, water supply, disposal of excreta, heating and ventilation of any public institution or building. Finally it was required to recommend from time to time standard works on the subject of hygiene for the use of the schools of the State.

The reputation of Michigan for healthfulness, since its earliest settlement had not been an enviable one. The class of diseases known as malarial had been of universal prevalence. They spared neither age, sex, nor condition, and during all the early years of the history of our State, its founders, the pioneers and their children, suffered from these diseases far beyond anything the present generation can imagine. During many months of the year over large areas, harvests could be but partially gathered, village work shops and stores were deserted and closed, schools were sparsely attended, and nearly all the activities of life were suspended. Pinched and sallow faces met the gaze everywhere and existence seemed a burden.

There were many years of disease and misery before drainage and sunlight gradually banished these enemies of human health and happiness until they have finally become nearly extinct in our borders. Scarcely a hint of the character of these enemies entered the minds of the physicians or sanitarians of those days. It is well to remember the foes that have been vanquished, to record the history of the conflicts had with them, and the weapons used to achieve success, for the campaign is to consist of many conflicts, and in no warfare is experience and knowledge of more value than in the one waged by sanitarians against the enemies of health and life. Our own history shows this to be true, for as the hostile hordes of malaria disappeared others more malignant appeared in our midst. These assumed new methods of attack. They concentrated

their forces and seemed to descend upon communities in battalions. Typhoid fever, cerebro-spinal meningitis, diphtheria and other adversaries of life became epidemic in the cities and villages of Michigan.

Man was powerless to resist them for he knew little concerning these unseen but powerful destroyers or of any methods whereby their constant and savage inroads could be checked. The friends of the law creating the State Board of Health were probably inspired by hope rather than belief in making investigations concerning the causes of epidemics one of the chief duties of its members. What these causes were, or how they could be sought out and their baleful influences counteracted, was an enigma not yet solved and but little considered.

It was known that measles, scarlet fever, small-pox and several other diseases could, in some way, be communicated by contact, and that one attack usually secured immunity from subsequent attacks.

Vaccination for small-pox had been proved to be efficacious, and that disease had largely ceased to menace the world with its horrors. Beyond this, science had scarcely taken a step in the direction of preventing or stamping out outbreaks of any of the communicable diseases, discovering their causes, or learning which of the diseases that afflict humanity, properly belonged to this class.

Scarcely a glimmer of the light that was soon to illume these problems and create the twin sciences, sanitation and biology, was then visible. Revelations of the microscope concerning low forms of life were still regarded, even by scientific men, as curiosities of nature only.

The relation of some of these forms of life to disease, was suspected by some, but believed in by only a few original investigators, in Euorpe, whose names are now familiar to the world as the greatest benefactors of their race that any age can show. The story of the labors of Schwann, of Davaine, of Tyndall, of Pasteur, Koch, and a host of later laborers in the fields of enquiry which have rendered *them* famous, is familiar to you all, and in the light of the knowledge those labors have revealed, the path which leads to success and victory is no longer the one of obscurity and doubt which, twenty-two years ago, your predecessors were expected to explore. Sanitation had but one dogma then. It was a very old dogma and can never be superseded. It may be expressed in the single word cleanliness. The opposite of cleanliness was the cause of disease. How filth caused disease, or why, amid filthy surroundings people were often healthy, were mysteries. With this lack of the knowledge now so common the accomplishments of the State Board of Health during the early years of its existence must have been comparatively of little practical value.

It was five years after its formation before Pasteur announced to the world his discoveries concerning anthrax, and it is from this date only, 1877, that what is called the Germ Theory of Disease, may be said to have had an existence. From then until now, what an expanse of knowledge concerning the cause and prevention of a large proportion of the diseases which affect humanity, has been opened to our view.

This knowledge which is daily widening is as continually increasing the capacity of the problems it presents. From a single dogma, sanitary knowledge has evolved, almost at a bound, a science of its own, correlated to many of the other sciences, and second to none of them in importance.

Its advance today is more rapid than any of its sisters, and he who keeps step with its speedy progress must be familiar with its history, and

have the time and the ability to properly digest and assimilate the facts which original workers, all over the world, are daily adding to its records. The practical work which all this knowledge makes valuable should never be entrusted to feeble or incompetent hands. I believe the history of the Michigan State Board of Health shows in this respect a list of names, of which any State might feel proud, many of them being known beyond the confines even of our own nation.

I should like to dwell on the results of the labors of these men, but you, equally with myself, are familiar with their results, showing as they do the saving of thousands of valuable human lives to their families and to the State. The Michigan State Board of Health has been a pioneer in many of its lines of life saving work. It has nearly always had among its membership men engaged in original investigations. It has at its service, probably the best equipped laboratory of hygiene on the Continent, having for its director one of its own members, Prof. Vaughan whose well-earned reputation cannot be added to by any words of mine.

This laboratory aids greatly the work of the State Board of Health, and is of much value to physicians and to the people. It furnishes facilities for promptly determining suspected cases of typhoid fever, diphtheria and tuberculosis. During the last two years, meetings of local health officers have been held at this laboratory for conference and for witnessing methods for the detection of disease organisms. These meetings are believed to be of the greatest value and should certainly be continued. I have endeavored to sketch briefly and it seems to me very imperfectly on this aniversary occasion some of the reasons why the people of Michigan should feel thankful for the law creating the State Board of Health, and for the absence of the epidemics whose inroads before its enactment, filled with mourning thousands of homes. That this feeling does exist among the people has been often manifested at the popular sanitary conventions held in two or three of the cities of the State every year, where expressions of gratitude for the work of the Board are very common. While it is true that members of the Legislature, now in session have made and are making serious efforts to abolish the present Board, alleging, as one of the reasons for such action, the large expense of carrying forward the lines of work upon which this Board is engaged, yet it is gratifying to know that no popular demand is at the foundation of this attempt. On the contrary there comes to us from all over the State not only from the medical fraternity but from citizens generally, expressions of the deepest concern and indignation at such action. These expressions show that the Michigan State Board of Health is firmly entrenched in the esteem and appreciation of the intelligent element of our community. This is not the first time in its history that this Board has been the target of ignorance and malice from legislators and others in authority. It is not likely to be the last.

Many of the acts of the Board are necessarily invasive of private rights, and result in making enemies of those who suffer from such acts. The quarantine established by this Board for the inspection of immigrants coming into this State and the disinfection of their baggage during the prevalence of cholera in Europe, was a case of this class. This action taken amid frantic appeals made by the people to this Board for protection, caused railroads some inconvenience and was resented by many of them. It was even defied by one and led to litigation that resulted in the law being sustained by the courts though the rules made by the Board were

regarded as exceeding the authority expressed in the law. But ignorance is equally prolific in provoking opposition. Sanitary science is yet young and comparatively few have obtained much insight into its mysteries. To such the present expenditure of one cent per capita per annum for the purposes for which the Michigan State Board of Health was created seems large, and not only is any additional sum asked for to protect the people from those diseases known to be preventible regarded as unnecessary, but the small sum now used is considered extravagant.

Until ignorance gives place to knowledge, this will continue. It is one of the duties of this Board to hasten the coming of that time. While we are doing much to overcome ignorance by means of the distribution of the board's literature, and the holding of Sanitary Conventions, are there not other methods which can be adopted to secure this end? The public school is an avenue through which we seek, by legislation, to enter. I earnestly hope we may be enabled to do so, and thus begin sanitary instruction where other instruction properly begins in the minds of our youth. But the main channel by which information reaches the people, is the public press. It is to this, that a large majority turn for knowledge concerning current events. The use made by this instrument by the Michigan State Board of Health is extremely limited. It consists but of little more than a condensation of the weekly report of sickness statistics sent to members and others from the office of the Secretary. With boundless information of interest and value at hand, with daily papers willing to publish short and interesting articles and with a community willing and anxious to absorb knowledge in this manner, it seems proper and right, that this information which is of greater value than any other, be presented to the people in the form in which they are disposed to receive it.

Education being the chief instrument upon which we must rely to accomplish the work we are set to do, should we not use this instrument in every promising field?

To do so may require of us more of time, more of energy and more of sacrifice in other ways, but these should not be wanting. We have accepted a trust second to no other in importance. The labors and responsibilities involved in this acceptance I believe no member of this Board desires to evade. If more of the talents given to each one of you are needed, I believe they will be forthcoming. The spirit and purpose which have inspired you in the past will, even if unappreciated by those to whom such spirit and purpose cannot appeal, continue to animate and stimulate you in the future.

Humanity needs your efforts and no higher reward can crown achievement in any department of human endeavor, than a consciousness of having been instrumental in the saving of human life, and the relieving of human woe.

The relations which have existed between the members of this Board during the time I have, through your partiality, presided over your deliberations, have been most friendly; and I desire in closing to thank you all for the courtesy and indulgence I have during that period uniformly received at your hands.

On motion of Doctor Baker, it was voted that the President's Address be published in the pamphlet proceedings of this meeting.

On motion of Doctor Granger, the Secretary was instructed to cast the ballot for Mr. Wells for President of the State Board of Health for the ensuing two years. Mr. Wells was declared elected.

President Wells made a few remarks, substantially as follows:—

I feel very grateful for the honor the Board has again conferred on me. I have endeavored to serve the Board to the best of my ability, and perhaps I have been able to be of more value because of my residence in the City. My duties in connection with quarantine were more or less onerous, but recently most of my work as President has been in connection with the proposed abolition of the Board. I had intended to make a number of recommendations regarding different lines of work in the Office; but, because of press of work, I have not had the time to write them out, but will endeavor to make these recommendations at the next meeting. I have certain ideas which I believe, if approved by the Board, would facilitate the work of the Office. I believe the work of the Board should be popularized through the newspapers, the most common medium through which knowledge is gained. I believe the Secretary is burdened with more work than it is possible for him to do, and that he should be relieved of some of the detail work of the Office. In other words I think there should be an assistant secretary who could not only popularize the work of the Board, but could relieve the Secretary of certain lines of work.

The President stated that he would announce the Standing Committees at the next meeting of the Board.

On motion of Doctor Baker, it was voted that the President appoint a committee, with power to act, to make arrangements for the Third Annual Conference of Michigan Health Officers, to be held at the State Laboratory of Hygiene, at Ann Arbor, sometime in June, the President to make his appointments after the Governor had appointed new members of the Board.

Prof. Fall said that he wished the Board would consider, as far as practicable, the Bialy bill, in order that there might be an expression of opinion. Although he did not wish to say he would favor a thing he knew but little about, he thought that some of the changes proposed by the Bialy bill would have to be made, and if the Board could decide what they would recommend it might benefit favorable public-health legislation. He thought the Board might concede some points and at the same time demand other points in the bill.

Doctor Granger said he favored the Bialy bill, and believed that it was certain to pass, and that it was demanded.

Mr. Wells believed that either the Miller or Bialy bill would pass, and that it was for the Board to decide which bill they would rather have become a law. He thought if the bill was not too radical, and did not provide for too many changes which might be fatal to the future work, and the Board could thereby gain some points, that the Board should recommend the Bialy bill.

Dr. Baker said that at first he rather fell in with the provisons of the Bialy bill, but the more he considered it, the more dangerous he concluded the bill would be. He said that a similar proposition had been made in the State of Maine, that in response to a request for his opinion

he had written Doctor Young of the Maine State Board of Health, and he thought the letter expressed his opinion of the similar proposition now being made in Michigan. Doctor Baker read the letter from pages 228-231, Book No. 31, as follows:—

MICHIGAN STATE BOARD OF HEALTH,
OFFICE OF THE SECRETARY,
Lansing, March 5, 1895.

A. G. Young, M. D., Secretary State Board of Health, Auyusta, Maine:

DEAR DOCTOR:—Your letter of March 1, is before me, asking for my opinion and reasons for and against the proposed amendment of the law in Maine so that the Secretary of the State Board of Health would be appointed biennially by the Governor, and not be eligible for more than six years successively

My opinion is that it would be in no sense an amendment; it would be a lamentable change.

The appointment should not be made by the Governor. It should not thus be made a political position. The Secretary should be chosen by a board whose members have been selected for their knowledge and interest in sanitary affairs.

The appointment of the Secretary should not be made biennially. It is for the interest of the State that a good Secretary shall not be planning what he is to turn his attention to at the end of two years in case he is not re-appointed; and a poor Secretary should be put out of office at the first regular meeting, without as long a notice as two years. The present law in Maine makes just such wise provisions as these:—"The Secretary shall hold his office as long as he shall faithfully discharge his duties thereof, but may be removed for just cause at a regular meeting of the board, a majority of the members voting therefor." I think your present law is the best plan.

I regard the proposed limiting of the term of the Secretary to six years as fatal to the highest progress in public-health work in Maine. In order to secure public-spirited, philanthropic and high-toned members, your law properly provides that the members of the Board shall have no compensation. As the executive officer of the Board, the Secretary should devote his entire time to the work. Under such circumstances, the Secretary must become more thoroughly a master of all branches of the work than it it is possible for the members to be; accordingly the Board must look to him for a certain amount of leadership, or at least of guidance. The work of the Board is largely one of education of the adult population of the State, on the restriction and prevention of the most important dangerous diseases; and the questions how best to accomplish this deal with some of the most complex problems in social science, as well as in medical and sanitary sciences. It is work on subjects not yet taught in the colleges and universities. The most that is there taught is preparatory only. The most important part of the education of sanitarians must still be largely gained by experience and observation in actual service. Therefore the terms of office of members should be long, and of the Secretary longer, because he is not only the executive officer, but must also be the advisor of the Board. A six years course in these complex studies is none too long during which to *prepare* for the best service to the people of a great State. The proposition to make the Secretary ineligible after six years, is equivalent to a proposition to have no Secretary who has had proper opportunity to best prepare himself for the most effective service of his State. To seriously make such a proposition, a person must be laboring under the delusion that the office was created for the purpose of giving politicians jobs, rather than for the best possible protection of human life and health, as I have good reason to know was the original purpose of the present law in your State. It seems a pity that every legislature must have to struggle within its own membership with iconoclasts who have no conception of the great movements for the bettering of the conditions of healthful existence. Not infrequently such members succeed in defeating legislation proposed by those who have devoted years of labor to studying out how best most lives can be saved. (Even the great and glorious State of Michigan is not entirely exempt from such occurrences.)

I sincerely trust that your State may be spared any so-called amendment, such as that to which you refer, of your very valuable law establishing a State Board of Health.

Very respectfully,

HENRY B. BAKER,
Secretary of the Michigan State Board of Health, Ex-President of the American Public Health Association, and Vice-President American Social Science Association.

On motion the Board adjourned at 4:20 P. M.

SPECIAL MEETING AT LANSING MAY 17, 1895.

A special meeting was called to meet in Lansing, May 17, 1895.* Prof. Delos Fall, of Albion; Doctor Samuel G. Milner, of Grand Rapids; Doctor Victor C. Vaughan, of Ann Arbor; Hon. Frank Wells, of Lansing and Secretary Henry B. Baker, were present; but, as some of the members were called before the Committee of the Legislature which was investigating the Board, and others were busy with members of the Legislature, there was no time for a formal meeting.

WORK OF THE OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH DURING THE FISCAL YEAR ENDING JUNE 30, 1895.

For each regular meeting of the State Board of Health the Secretary prepares a report in the office during the quarter just preceding. The abstracts of these might be published in the proceedings of the several meetings, but are collected and published here in order to bring the reports of work in the office all together. Following these quarterly reports will be found a summary for the year, and a general report for the year, prepared however, on a different plan, not repeating the details in the quarterly reports, but outlining the nature of the work, and including copies of leaflets and other short publications issued by the office during the year.

SECRETARY'S REPORT OF DANGEROUS COMMUNICABLE DISEASES, OF WORK DONE IN THE OFFICE OF THE STATE BOARD OF HEALTH, AND OF THE CONDITION OF HEALTH GENERALLY IN MICHIGAN DURING THE QUARTER ENDING SEPTEMBER 30, 1894.

Dangerous Communicable Diseases.

The number of reports of outbreaks of dangerous communicable diseases in Michigan, received from all sources and filed, and concerning which action was taken by this office, during the quarter, are as follows: for diphtheria, 93; for scarlet fever, 107; for typhoid and typho-malarial fever, 155; for measles, 21; for small-pox, 2; and for consumption, 42. Total for the six diseases, 420.

The number of communications relative to dangerous communicable diseases, received and placed on file during the quarter, was 1,972.

* Telegrams calling this meeting, and correspondence relative thereto, are copied on Letter Book No. 31, May 16-23, 1895.

Relative to dangerous communicable diseases, letters, written cards, and demands for weekly and final reports on cards, or in the form of the circular letter, were sent out during the quarter to the number of 1,692.

The "final" reports of outbreaks received and filed during the quarter, were: for diphtheria, 61; scarlet fever, 91; typhoid and typho-malarial fever, 59; measles, 104; small-pox, 13; consumption, 1. Total for the six diseases, 329.

During the quarter, the local columns of 696 newspapers, have been looked over for reports of occurrence of communicable diseases. This has resulted in giving this office information of the alleged occurrence of 5 outbreaks of diphtheria, 4 outbreaks of scarlet fever, 7 outbreaks of typhoid and typho-malarial fever, 2 outbreaks of measles, and 1 outbreak of small-pox. To what extent the reports of these alleged outbreaks were verified, is shown in the accompanying table.

TABLE I.—THIRD QUARTER OF 1894.—*Showing the number of Outbreaks of Diphtheria, Scarlet fever, Typhoid fever, Measles, Small-pox and Consumption, from July 1 to September 30, 1894, of which notice was received at the office of the Michigan State Board of Health; the per cent of reports, information concerning which was received through the Newspapers; the per cent of newspaper reports which were confirmed by the health officer; the per cent of newspaper reports which were denied by the health officer; and the per cent relative to which no reply was received from the health officer.*

Diseases.	Reports from *all* sources, July 1 to Sept. 30, 1894.	Per cent of all reports which were obtained from the newspapers.	Per cent of newspaper reports which were confirmed by the health officer.	Per cent of newspaper reports which were denied by the health officer.	Per cent of newspaper reports to which the health officer made no reply to notice sent from this office.
Diphtheria	93	5	80	20	0
Scarlet fever	107	4	25	50	25
Typhoid fever	155	5	71	29	0
Measles	21	9	50	0	50
Small-pox	2	50	100	0	0
Consumption	42	0	0	0	0
Averages for the six diseases		5	68	26	11

Small-pox in Michigan in Third Quarter of 1894.

[The Secretary reported relative to one outbreak of small-pox in Clayton township, Genesee Co. and one in Rives township, Jackson Co. This portion of the Secretary's quarterly report together with other details will be found printed in "Part II" of this report in connection with the article on Small-pox in Michigan in 1894.]

Compiling, Editing, Proof-reading, Printing, Etc.

A compilation of reports from health officers and clerks, relative to Scarlet Fever in Michigan in 1892, and the tables for the article, have been made. The Compilation of the reports relative to "Typhoid Fever in Michigan in 1892" has been commenced. The compilation of the "Diphtheria in Michigan in 1892" has been proved, and the proving of "Scarlet Fever in Michigan in 1892" is well under way.

Articles for the Report for 1892, have been prepared on the following subjects: Typhoid Fever in 1891; Typhus Fever; Consumption; Dysentery; Membraneous Croup; Mumps; Chicken-pox; Erysipelas; Poisoning from Canned Fruit; Poisoning from Lead Pipe; Poisoning from Tyrotoxicon; Nuisances in Michigan in 1891; and the article relative to injuries and loss of life and property from the use of kerosene in Michigan in 1891 is nearly ready for the printer.

The articles mentioned in the preceding paragraph, with the exception of the one relating to kerosene, have been edited and sent to the State Printer for publication in the Annual Report of the Board for 1892.

Proof has been read on the larger portion of the "First Part" of the Report for 1892, and on that portion of the "Second Part" following the article on Measles. Proof has also been read on the Proceedings of the July meeting.

The printing on the Report for 1892 has been well advanced and it is expected that the printing will be completed by the first of November. It is hoped that the Report will be ready for distribution some time during the fourth quarter of 1894.

Work on Meteorology.

The regular tri-daily meteorological observations have been continued at this station, and a summary for each week and month during the quarter has been made for use in this office in connection with sickness statistics. The monthly summary has been sent at the end of each month to the director of the Michigan Weather Service and local forecast official for his use; it is sent by him to the chief of the United States Weather Bureau at Washington, D. C.

Ozone test paper (supply for three months) was sent to each of seventeen meteorological observers in Michigan.

Diagrams Nos. V., XIV., and XV., to illustrate the article relating to meteorology in Michigan in 1892, were made, the photo-engraved plates therefrom procured, and the article for the annual report for 1893 completed and sent to the printer.

Nine additional diagrams have been made and photo-engraved, for use in the annual report of this Board for 1893.

Compilations on meteorological registers for 1893, except barometer, are nearly completed.

Meteorological registers for April to July, 1894, inclusive, have been received, examined, and computations made (barometer and humidity excepted) for each of eleven stations.

Distribution of Publications, etc.

Copies of the annual report for the year 1891, to the number of 2,700, were sent to: Sanitary journal exchanges, secretaries of other state boards

of health and state medical societies, correspondents, meteorological observers, meteorological exchanges, members of the State board of corrections and charities, superintendents of State institutions, health officers in other States, libraries, health officers and clerks of townships, cities, and villages, and presidents of villages, and mayors of cities in Michigan, and sanitarians in this and other States.

The proceedings of the Holland Sanitary Convention has been sent to presidents of villages, the proceedings of the Charlevoix Convention has been sent to clerks of villages, and the proceedings of the Sanitary Conventions at Traverse City, Owosso, Otsego, a paper by Dr. Baker on the "Restriction and Prevention of Dangerous Communicable Diseases," a discussion on "The Prevention of Consumption" by Dr. Baker, have been sent to each of 970 health officers of townships in Michigan.

About 400 copies of the proceedings of the Menominee Convention have been sent to citizens, officers of the convention, and to those who took part in the convention.

The proceedings of the Menominee Convention, the consumption slip, and the abstract of proceedings of the July 13, 1894, meeting, were sent to Members and ex-members of this Board, sanitary journal exchanges, secretaries of State boards of health, and of State medical societies, meteorological observers and exchanges, superintendents of State institutions, libraries, correspondents, health officers in other States, health officers of cities and villages in Michigan, presidents and secretaries of preceding sanitary conventions. The pamphlet proceedings of the Menominee Convention, has also been sent to clerks and mayors of cities in Michigan.

The announcement of the Union City Convention has been distributed to the number of about 1,250 copies. The announcement for the Charlotte Convention has been distributed to the number of 1,350 copies.

About the usual number of pamphlets on the restriction and prevention of the different dangerous diseases were sent to the health officers of localities in which dangerous diseases had been reported. It was at the same time requested of these health officers that the pamphlets be distributed to the neighbors of the persons sick with such diseases, and to such other persons as they would be likely to benefit.

In response to special requests of sanitarians in this and other States, copies of Annual Reports, proceedings of meetings and sanitary conventions, and pamphlets on the restriction and prevention of the dangerous communicable diseases, have been sent where it was thought likely to benefit public-health interests.

The usual record of the distribution of publications has been kept.

A list of the "Names and Addresses of Health Officers in Michigan for the year 1894-95" has been made and printed to the number of 1,700 copies, and distributed to each health officer of a township, city or village, whose name had been returned to this office. In any locality where the list showed that the name and address of the health officer had not been returned, the space was marked and sent to the President of the Village, Mayor of the City, or Supervisor of the Township, as the case may have been. This has resulted in our receiving the names of a few health officers in addition to those printed in the list.

Accessions to the Library, Card-Cataloguing, etc.

During the quarter 93 books and pamphlets and 320 numbers of journals (weeklies, monthlies, and quarterlies), have been received and entered in the library-accession book of this Office.

The work on the card-catalogue of the library has been continued.

The work in connection with the financial accounts of the Office has been continued.

Publication of Circular Letter Relative to Consumption.

In August, a circular letter [No. 213.] "Official demand for special reports relative to consumption, under Section 8, Act 81, laws of 1873," was planned and printed to the number of 500 copies. The circular requests that the health officer make weelky reports on blank "M," and give any information he may possess on the subject, which will enable the State Board to have a "general supervision of the interests of the health and life of the citizens of this State." The circular will be found printed in this Report in connection with the article on "Consumption."

Pamphlet on the Restriction and Prevention of Typhoid Fever.

At the July meeting of this Board the pamphlet on "The Prevention of Typhoid Fever" was ordered reprinted, and the new edition was to contain the most important points in the leaflet on "Typhoid and Typho-Malarial Fever" the publication of which was discontinued.

Accordingly the pamphlet on "The Prevention of Typhoid Fever" was revised, and the "Eighth amended edition" has been printed to the number of ten thousand copies.

Publication of the Slip Relative to the Prevention of Consumption.

The slip containing, on one side the resolution of the Board relative to reporting cases of tuberculosis, and on the other side a short statement of methods for the prevention of consumption, has been reprinted to the number of five thousand copies. This was the second edition of the two-page slip. [A copy of the edition in June, 1894, is printed on page lxvii of the Annual Report of this Board for 1894.]

Proceedings of Second Annual Conference of Michigan Health Officers.

The "copy" for the pamphlet proceedings of the Second Annual Conference of Michigan Health Officers, held at Ann Arbor, has been prepared, edited and the copy sent to the State Printer. It is hoped to soon have the pamphlet ready for distribution.

Extra Work During This Quarter.

Owing to the fact that the State Board of Agriculture required the room which had been used by three clerks of this Office, it became necessary, in order to have room for the clerks, to remove the contents of our store-room to the old State-Office building. Owing to the crowded condition of the Office, many things had been carried to the store-room which could not without sorting be destroyed, or go into the waste paper. This sorting has involved the use of considerable time, most of which had to be taken from regular office work.

The summer quarter is the time when the clerks generally want to take their annual vacation. This has made the work of the Secretary considerably greater than it would otherwise have been.

Sanitary Inspections of Localities, and Advice to Officers and Citizens.

During the quarter, your Secretary has been called upon for advice involving the visiting of a number of localities. The association having control of Harbor Point, desiring to make that beautiful summer resort a model of sanitary excellence, invited me to visit and examine it, and advise with its Board of Trustees with reference to the best plan for the disposal of excreta and waste water. Inasmuch as the welfare of a considerable number of people is involved, I did so, and will present herewith a copy of my written report made to the Board of Trustees.

*Diphtheria at Laingsburg.**

An outbreak of Diphtheria at Laingsburg, Shiawassee county, did not seem to be under the control of the local health authorities, and by request of citizens, I visited Laingsburg, met the health officer and local board of health in the council chamber, and conferred with and advised them concerning the best measures for stamping out the disease. In that little village of less than one thousand inhabitants, there was then said to have occurred about forty cases of diphtheria. Since then the health officer has reported that since the first case in February there have been 72 cases, including seven deaths. It has invaded 34 families. Oct. 11, the health officer reports only one case remaining.

*Diphtheria at Portland.**

An outbreak of diphtheria in the village of Portland, Ionia county, in which four deaths occurred in one week, startled the health officer and others. The health officer requested me to visit the locality, and the president of the village came to this office to ask for aid from the State Board of Health. Accordingly I went to Portland, met the health officer, local physicians, local board of health and others, and advised a course of action by the householders, physicians, health officer, local board of health, and prosecuting attorney if necessary, which if strictly followed will, in my judgment, stamp out the disease. The president of the village assured me that vigorous action would be taken in the directions which I had indicated.

Typhoid Fever in Marine City. Analyses of Water-Supply.†

Dr. Shaver, the city health officer, has reported since June 9, ten cases of typhoid fever in Marine City. No deaths. He intimates in his correspondence that there are other cases of which he has not been notified. In answer to the question as to the supposed cause of the fever, he states, in his correspondence, that "I have found in the water taken from the various hydrants in that vicinity" (where the disease was) "large numbers of worms resembling earth-worms, from one-half to two inches in length. There is certainly something wrong with our water." In

* This subject will be dealt with, perhaps more fully, in the article on Diphtheria in Michigan in 1894, farther on in this Report.

† This subject will be dealt with in the article on Typhoid fever in Michigan in 1894, further on in this Report.

another communication he says: "During the last two or three years there has been a great number of cases of typhoid fever and diphtheria in our city, the cause of which has not been determined; I have recommended to the board of health that there be made an analysis of the drinking-water provided by our system of water-works; also of the water of Belle river, a stream with scarcely any current, running through the city and emptying into St. Clair river within the city limits, and into which many sewers empty above the surface of the water. Our water-supply is obtained from St. Clair river only twenty-five feet from shore, and above this point there are two private sewers emptying into this water, one of which is within 300 yards of the water-works."

The general water-supply of the city being suspected as the cause of the typhoid fever, and therefore many lives being, possibly, jeopardized, the secretary thought best to have the water examined, and accordingly caused a sample taken from the same source as that drank by the person having the fever, to be collected and a chemical and bacteriological examination of it, to be made at the Michigan State Laboratory of Hygiene, at Ann Arbor. Dr. McClintock, assistant in charge of the laboratory in the absence of Dr. Vaughan, made the examinations and reported in detail to this office. Two samples of the water were found to be chemically bad. "The worms found are of the genus Gordius, in one stage, a parasite on water beetles, etc." The microscopical examination showed nematoid worms and ova, large vegetable debris, desmids, diatoms, infusoria, and bacteria. Germs were found in the water, which, when inoculated in white rats promptly killed them. Dr. McClintock gave his conclusions and recommendations as follows:—

"This water is bad chemically and bacteriologically. Still I cannot say positively that it will produce disease, as the first sample was so long delayed that the bacteriological analysis was not reliable. The water should not be used for drinking purposes without being boiled."

The result of this examination was promptly communicated to Dr. Shaver, health officer of Marine City.

The practical test of the water by its daily use seems to teach us that a small proportion of those who use it contract typhoid fever. But no person desires to have the fever, it being considered a preventable filth-disease, so the water should be boiled before it is used, and as soon as practicable either the sewers which empty into it should be removed, or the in-take pipe put further up the stream and in a better place.

Work in Connection with Sickness Statistics.

During the third quarter of 1894, 2,090 blank postal report cards, 153 record-books and 67 hektographed circular letters regarding weekly card-reports, have been mailed to 141 health officers and regular correspondents; 1,495 weekly card-reports have been received and entered on the register; 50 copies of the hektographed weekly bulletin "Health in Michigan," were mailed each week, and 108 copies of the monthly bulletin "Health in Michigan" have been hektographed and mailed each month. These bulletins have been consolidated for this quarterly report. The compilation of the weekly card-reports of sickness during the year 1892, for the annual report for 1893 has been completed, and work has also been done on the compilation for the annual report for 1894.

Health in Michigan in the Third Quarter of 1894. Communicable Diseases.

Compared with the preceding quarter (April, May and June), reports from all sources show *typhoid fever* to have increased by an average of *forty-nine* places, *consumption* to have increased by an average of *thirteen* places, *measles* to have decreased by an average of *seventy-three* places, *scarlet fever* to have decreased by an average of *twenty-eight* places, *diphtheria* to have decreased by an average of *twelve* places and *small-pox* to have decreased by an average of *three* places.

Meteorology at one Central Station, and Sickness throughout Michigan from all causes, Third Quarter of 1894, compared with the Preceding Quarter.

A comparison of meteorological conditions of the third quarter of 1894, with the meteorological conditions of the preceding quarter, shows the prevailing direction of the wind to have been south-west (instead of north-west), the average velocity 1.2 miles per hour less, the temperature 10.21 degrees higher, the rainfall 2.48 inches less, the absolute humidity considerably more, the relative humidity less, the day ozone slightly less, the night ozone much less and the depth of water in the well at Lansing 4 inches less in the third quarter of 1894.

Compared with the preceding quarter (April, May and June), the reports from regular observers show a marked increase of dysentery, typhoid fever, diarrhea and remmittent fever, and a marked decrease of measles, pneumonia, influenza, pleuritis, erysipelas, inflammation of kidney, tonsillitis, scarlet fever and bronchitis in the third quarter of 1894.

The Weather and the Health in Michigan in the Third Quarter of 1894, Compared with the Average for the Eight Years, 1886–1893.

A comparison of the meteorological conditions of the third quarter of 1894, with the average for the third quarters in the eight years 1886–1893, shows that in 1894, the prevailing direction of the wind was the same (south-west), the velocity was 0.7 of a mile per hour greater, the temperature was 1.97 degrees higher, the rainfall was 1.04 inches less, the absolute humidity was slightly less, the relative humidity was much less, the day and night ozone were slightly more and the depth of water in the well at Lansing was 2 inches less.

Compared with the average in the corresponding quarters in the eight years 1886-1893, the reports from regular observers indicate that typhoid fever was more than usually prevalent, and that erysipelas, intermittent fever and remittent fever were less than usually prevalent in the third quarter of 1894.

SECRETARY'S REPORT OF DANGEROUS COMMUNICABLE DISEASES, OF WORK DONE IN THE OFFICE OF THE STATE BOARD OF HEALTH, AND OF THE CONDITION OF HEALTH GENERALLY IN MICHIGAN DURING THE QUARTER ENDING DECEMBER 31, 1894.

Dangerous Communicable Diseases.

The number of reports of outbreaks of dangerous communicable diseases in Michigan, received from all sources and filed, and the corresponding number concerning which action was taken by this office, during the quarter, are as follows: for diphtheria, 155; for scarlet fever, 189;

for typhoid and typho-malarial fever, 176; for measles, 16; for small-pox, 21; and for consumption, 8. Total for the six diseases, 565.

The number of communications relative to dangerous communicable diseases, received and placed on file during the quarter, was 2,482.

Relative to dangerous communicable diseases, letters, written cards, and demands for weekly and final reports on cards, or in the form of the circular letter, were sent out during the quarter to the number of 2,012.

The "final" reports of outbreaks received and filed during the quarter, were: for diphtheria, 96; scarlet fever, 100; typhoid and typho-malarial fever, 143; measles, 2; small-pox, 13; consumption, 0. Total for the six diseases, 347.

During the quarter, the local columns of 800 newspapers, have been looked over for reports of occurrence of communicable diseases. (This work is done by the clerk who acts as messenger and janitor, in the intervals of his performance of other duties.) This has resulted in giving this office information of the alleged occurrence of 6 outbreaks of diphtheria, 3 outbreaks of scarlet fever, 17 outbreaks of typhoid and typho-malarial fever, 1 outbreak of measles, and 3 outbreaks of small-pox. To what extent the reports of these alleged outbreaks were verified, is shown in the accompanying table.

TABLE I.—FOURTH QUARTER OF 1894.—*Showing the number of Outbreaks of Diphtheria, Scarlet fever, Typhoid fever, Measles, Small-pox and Consumption, from October 1 to December 31, 1894, of which notice was received at the office of the Michigan State Board of Health; the per cent of reports, information concerning which was received through the Newspapers; the per cent of newspaper reports which were confirmed by the health officer; the per cent of newspaper reports which were denied by the health officer; and the per cent relative to which no reply was received from the health officer.*

Diseases.	Reports from *all* sources, Oct. 1 to Dec. 31, 1894.	Per cent of all reports which were obtained from the newspapers.	Per cent of newspaper reports which were confirmed by the health officer.	Per cent of newspaper reports which were denied by the health officer.	Per cent of newspaper reports to which the health officer made no reply to notice sent from this office.
Diphtheria	155	4	67	0	33
Scarlet fever	189	2	100	0	0
Typhoid fever	176	10	47	12	41
Measles	16	6	0	0	0
Small-pox	21	14	100	0	0
Consumption	8	0	0	0	0
Averages for the six diseases		5	60	6	33

Small-pox in Michigan in the fourth quarter of 1894.

Eleven new outbreaks were reported during the quarter. These occurred in Manchester township, Washtenaw Co.; Norvell township, Jackson Co.; Cheboygan city; St. Johns village, Clinton County; Royal Oak township, Oakland Co.; Sebewa township, Ionia Co.; Danby township, Ionia Co.; Adrian city; Watersmeet township, Gogebic Co.; Chester township, Eaton Co.; and Marquette city. Of these outbreaks, final reports of those at Norvell township, Cheboygan and Adrian, have been received. It is inferred that those at Manchester township, Chester township and Danby township are over, but no final reports of these three outbreaks have yet reached this office at this date—Jan. 1, 1895.

Small-pox is still present at Marquette, Detroit, St. Johns, Sebewa township, Royal Oak township, Watersmeet township.

The outbreak which began in Detroit during the second quarter of 1894, still continues. During the quarter just closed, there have occurred in that city, 72 cases and 21 deaths, which make a total of 142 cases and 34 deaths since the outbreak began. From the beginning of the outbreak in Detroit, (about May 25, 1894,) up to the first week of October, there occurred 70 cases and 13 deaths, which is a death rate of 19 per cent. During the quarter ending Dec. 31, 1894, there have occurred 72 cases and 21 deaths, a death rate of 29 per cent during the last half and cooler months during which the outbreak has existed.

In the thirty-eight oubreaks of small-pox reported during the year 1894, including Detroit, there have occurred 262 cases and 60 deaths, a death rate of 23 per cent. The death rate for the city of Detroit and for localities outside of that city, have been nearly the same,—Detroit a little less than 24 per cent, and outside localities, a fraction less than 22 per cent.

In twenty-one of the twenty-nine outbreaks now over, the infection was restricted to the one house in which it first occurred.

Summary Relative to the Year, 1894.

During the year 1894, this office took action upon 2,036 outbreaks of dangerous communicable diseases, which number includes 469 outbreaks of diphtheria, 656 outbreaks of scarlet fever, 447 outbreaks of typhoid and typho-malarial fever, 275 outbreaks of measles, 16 outbreaks of small-pox, and 128 outbreaks of consumption.*

Relative to dangerous communicable diseases, letters, written cards, etc., were sent out during the year to the number of 7,135. The number of communications relative to such diseases, which were received and placed on file during the year was 8,418.

A record is kept of facts concerning every outbreak of a "disease dangerous to the public health," upon which action is taken by this office, and also of every communication relating thereto, received or sent out. This required over 15,500 entries to be made in the "Record Books," one of which books is kept for each dangerous communicable disease.

* Consumption for the last nine months of the year only.

TABLE II.—THE YEAR 1894.—*Showing the number of Outbreaks of Diphtheria, Scarlet Fever, Typhoid Fever and Measles, from January 1 to December 31, 1894, of which notice was received at the office of the Michigan State Board of Health; the per cent of reports, information concerning which was received through the Newspapers; the per cent of newspaper reports which were confirmed by the health officer; the per cent of newspaper reports which were denied by the health officer, and the per cent relative to which no reply was received from the health officer.*

Diseases.	Reports from *all* sources, Jan. 1 to Dec. 31, 1894.	Per cent of all reports which were obtained from the newspapers.	Per cent of newspaper reports which were confirmed by the health officer.	Per cent of newspaper reports which were denied by the health officer.	Per cent of newspaper reports to which the health officer made no reply to notice sent from this office.
Diphtheria.....	*469	4	50	22	28
Scarlet fever. ...	*656	4	57	9	35
Typhoid fever ...	*447	7	48	23	29
Measles.....	*275	6	33	13	53
Small-pox.....	*61	20	50	50	0
Consumption †...	*128	0	0	0	0
Averages for the six diseases....		5	48	21	30

* The numbers of outbreaks given in this table do not necessarily agree with the numbers given in tables in another part of the Annual Report, for the reason that all alleged outbreaks, of which information was obtained from the newspapers and other sources are included in this table. If the health officers deny that such outbreaks occurred, or if they make no response to the letters sent from this office, relative to newspaper reports, such alleged outbreaks are not included in the compilation of that disease.

† Consumption for the last nine months of the year only.

During the year 1894 compared with the year 1893, action was taken on outbreaks of dangerous communicable diseases as follows: On diphtheria, 71 outbreaks less; scarlet fever, 18 outbreaks less; on typhoid and typho-malarial fever, 53 outbreaks more; measles, 4 outbreaks more; and small-pox, 59 outbreaks more than in 1893. In all 155 outbreaks more were acted upon in 1894 than in 1893, and 363 outbreaks more in 1894 than in 1892.

Compiling, Editing, Proof-Reading, Printing, etc., last quarter, 1894.

The articles relating to injuries and loss of life and property in Michigan in 1891, from the use of kerosene, gasoline, naphtha, etc., have been completed.

The article relative to nuisances in Michigan in 1892, has been nearly completed.

The article relating to diphtheria in Michigan in 1892 has been completed ready for the printer.

A compilation of reports from all sources relative to typhoid fever in Michigan in 1892, has been made, and a similar compilation relative to measles in Michigan, for the same year, has been about half completed.

The compilation of reports from all sources, relative to scarlet fever in Michigan during the year 1892, has been proved and some of the tables based thereon have been made.

Those portions of the annual reports from health officers and clerks of townships, cities and villages for the year 1893, which relate to diphtheria have been compiled, and the compilation of such parts of those reports as relate to scarlet fever is well advanced.

Copy has been prepared for the pamphlet proceedings of the Sanitary Convention held under the auspices of the State Board of Health at Union City, Oct. 25 and 26, 1894, and a portion of the copy has been sent to the printer.

The copy for the proceedings of the Charlotte Sanitary Convention is now nearly ready for the printer.

Copy on the proceedings of the Second Annual Conference of Health Officers, at Ann Arbor, June, 1894, has been prepared and the proceedings printed in pamphlet form.

The index for the Annual Report of this Board for the fiscal year ending June 30, 1892, has been made and printed.

Proof has been read on the following: Proceedings of the Second Annual Conference of Health Officers; Proceedings of the Meeting, Oct. 12; and articles for the Annual Report for 1892 relating to the following subjects: Membraneous Croup, Chicken-pox, Erysipelas, Leprosy, Hydrophobia, Glanders, Tyrotoxicon Poisoning, Poisoning from Canned Currants, Poisoning by Lead Pipe, Suspected Coffee Poisoning, Alleged Nuisances, Injuries and Loss of Life and Property from Kerosene, Gasoline and Naphtha; and also on the index for the Annual Report for the year 1892.

That portion of the Report for the Fiscal year ending June 30, 1892, relative to the above-mentioned articles (including the Index) has been printed, and the Report is now being bound by the State Printer. Copies will be ready for distribution by the middle of January.

Hektograph work to the number of 1,650 pages has been made, of which about 350 pages were relative to the Small-pox situation in Michigan since January 1, 1894, being in the form of tabular statements. Only 35 pages have been notifications relative to possibly infected immigrants.

A diagram "Ages of persons, 5 to 80 years, who died from diphtheria in Massachusetts during the period, 22 years, 1863–84" was hektographed to the number of 41 copies. A diagram similar to the foregoing, but for Michigan for 21 years, 1872-92, was hektographed to the number of 37 copies.

Work on Meteorology.

The regular tri-daily meteorological observations have been continued at this station, and a summary for each week and month during the the quarter has been made, for immediate use in this office in the weekly and monthly bulletins relating to sickness statistics. The monthly summary has been sent, at the end of each month, to the Director of the Michigan Weather Service and Local Forecast Official at Detroit for his

use, and it is sent by him to the Chief of the U. S. Weather Bureau at Washington, D. C.

Meteorological blank registers, envelopes, postal cards, ozone test-paper, etc., were sent to observers for the State Board of Health on Dec. 15, for their use in 1895.

The article relating to Meteorology in Michigan in 1892 has been sent to the State Printer, and two forms have been printed, for the Annual Report for 1893.

Distribution of Publications, etc.

About 600 copies of the Proceedings of the last regular meeting, (Oct. 12, 1894) have been distributed to: Members and Ex-members of this Board, Sanitary Journal Exchanges, Meteorological Observers, members of the State Board of Corrections and Charities, Secretaries of State Boards of Health, Health Officers of cities and villages in Michigan, Judges of the Supreme Court, and Sanitarians.

About 1,300 copies of the Programs of the Union City Sanitary Convention, and about 1,300 copies of the Program for the Charlotte Sanitary Convention have been distributed, from this office.

During the quarter 1,573 envelopes were directed to health officers of townships, cities and villages, and about the same number (1,572) of envelopes were directed to clerks of townships, cities and villages. These envelopes were used in sending to each clerk and health officer in Michigan blank forms for making annual reports of "Diseases dangerous to the public health" during the year 1894, a circular letter giving instructions for making out the annual reports, and an envelope for the return of the report to this office. This material was mailed from this office Dec. 29 and 31, 1894.

About the usual numbers of pamphlets on the restriction and prevention of the different dangerous diseases were sent to the health officers of localities in which dangerous diseases have been reported present. It was at the same time requested of these health officers that the pamphlets be distributed *to the neighbors of the persons sick with such diseases*, and to such other persons as they would be likely to benefit. In response to special requests of sanitarians in this and other States, copies of annual reports, proceedings of Sanitary Conventions, proceedings of meetings, and pamphlets on the restriction and prevention of the dangerous communicable diseases, have been sent where it was thought likely to benefit public-health interests.

The usual record of distribution of publications has been kept.

Accessions to the Library, Card-cataloguing, etc.

One hundred and eighteen books and pamphlets, and some 325 numbers of journals (weeklies, monthlies, quarterlies), have been received and entered in the library-accession book of this Office.

Work on the card-catalogue of the library has been continued.

The work in connection with the financial accounts of the Office has been continued.

The Michigan Plan for the Restriction of Consumption.

Your Secretary has recently received a letter from Dr. H. B. Horlbeck, who for many years has been the efficient Health Officer of Charleston, S. C., a prominent member of the American Public Health Association, and a prominent sanitarian in this country, in which the hope is expressed that Charleston may follow the "good example set by the State of Michigan in attacking consumption or tuberculosis." In accordance with Dr. Horlbeck's request, Secretary Baker sent him pamphlets, leaflets, copies of laws under which the work is being done in Michigan, and diagram's showing the result of a similar work which has been so successful in Michigan in lessening the number of deaths from scarlet fever. The information given Dr. Horlbeck related to Michigan's plan for the legal control of tuberculosis, and more especially for the restriction of the disease through the systematic and continuous education of the people most endangered—the relatives, friends and associates of consumptives.

Medical Attendance on an Indigent Person is a Charge upon the County.

About December 14 the Secretary received a letter from a health officer of a township, who had been called as a physician to treat a case of typhoid fever in a township of another county. He had presented his bill to the health officer of that township, the health officer had certified to its correctness; and the bill was presented to the board of supervisors. The original amount of the bill was $33.00, and the board of supervisors cut the bill to $19.00. The attending physician had been obliged to go a long distance, and had not at any time charged to exceed $2.00 per visit. The reduction in the bill therefore seemed to be unreasonable. The Secretary's reply was substantially as follows:

STATE BOARD OF HEALTH,
OFFICE OF THE SECRETARY,
Lansing, Michigan, December 14, 1894.

DEAR DOCTOR:—Replying to your letter of Dec. 12, it would seem from the facts before me that your bill was extremely reasonable, in the case of —— ——, Michigan, and should have been allowed by the Board of Supervisors.

Section 1647 Howell's statutes provides that where a person is sick or infected with a dangerous communicable disease, the local board of health of the township shall make such provisions as they deem necessary by providing nurses and other assistance and necessaries, which shall be at the charge of the person himself, his parents or other persons, who may be liable for his support, if able; otherwise at the charge of the county to which he belongs. Medical attendance is certainly one of the "necessaries" mentioned in this section.

The Supreme Court of Michigan has decided (3rd Mich. Report, p. 475) that when any expenses incurred under this section are chargeable to the county, and the amount due has been ascertained, and fixed by the local board of health, it is the duty of the Board of Supervisors to allow at once that amount, and to provide for its payment. The Board of Supervisors have no discretion in the matter further than to ascertain whether the patient or those who may be liable for his support, are able to pay the expenses incurred under this section.

The only criticism that I might make is that your bill should have been allowed by the local board of health, then the Board of Supervisors should allow "that amount" and provide for its payment. I advise you to present the bill to the local board of health, and then again to the Board of Supervisors, with a reference to 3rd Michigan Report, 475.

w of no higher *law*, in this State, than the decision of the State Supreme Court, and that decision lear, as is shown in the footnote on page 3 of the pamphlet [120] which I send you herewith. In envelope I send you another marked copy, which you may want to use, to show to Mr. —— that w" is very plain, and not as his letter says. (1) The health officer and the local board are l to "contract such bills;" (2) the law, section 1647 Howell's statutes, provides pay by the county; there has been appeal from the Board of Supervisors to the Supreme Court, and this subject has cided by that court of last resort—3rd Michigan Report, 475.

Very respectfully,

HENRY B. BAKER,
Secretary.

Special Investigations by the Secretary.

ring this quarter many urgent requests have been made of this office in expert diagnostician, and for aid in restricting communicable ses. Upon an urgent request, your secretary visited Manchester to e relative to the best methods to adopt for the restriction of small- it that place.

ur secretary has visited the townships of Portland, Sunfield, Sebewa Danby, Ionia county, to see whether it was necessary to establish a ntine under the State law against Sebewa and Danby in which hips small-pox had broken out. I advised with the health officials townships and villages surrounding Sebewa and Danby, concern- ow quarantine could be practically established by the local boards alth, under the law which authorizes the local board to make and e regulations. I also visited Sebewa and Danby, and advised with ting health officials of those townships.

Sanitary Conventions at Union City and at Charlotte.

interesting and successful Sanitary Convention was held under the ces of this Board at Union City, Oct. 25 and 26. Another Sanitary ention was held at Charlotte, Nov. 22 and 23, 1894. This Sanitary ention also was a very successful one.

Re-arranging the Secretary's Room.

e secretary's room has been thoroughly cleaned, and a large file case d on the east side of the room. Linoleum has been placed on the instead of the old carpet which has been there since the Capitol was leted. The re-arranging of this room has occasioned considerable in addition to the regular work of the office.

Work in Connection with Sickness Statistics.

ring the fourth quarter of 1894, 1,875 blank postal report cards, 125 d books and 11 hektograph circular letters regarding weekly card ts, have been mailed to 117 health officers and regular correspond- 1,306 weekly card reports have been received and entered on, the ter; 53 copies of the hektographed weekly bulletin "Health in igan," were mailed each week, and 110 copies of the monthly bulletin

"Health in Michigan," have been hektographed and mailed each month. These bulletins have been consolidated for this quarterly report. Work has also been done on the compilation of the weekly card reports of sickness during the year 1893, for the annual report for 1894.

Health in Michigan in the Fourth Quarter of 1894. Communicable Diseases.

Compared with the preceding quarter (July, August and September), reports from all sources show *scarlet fever* to have increased by an average of *forty-three* places, *diphtheria* to have increased by an average of *thirty-six* places, *typhoid fever* to have increased by an average of *thirty-seven* places, *small-pox* to have increased by an average of *three* places, *consumption* to have increased by an average of *two* places and *measles* to have decreased by an average of *eleven* places.

Meteorology at one Central Station, and Sickness throughout Michigan from all Causes, Fourth Quarter of 1894, Compared with the Preceding Quarter.

A comparison of the meteorological conditions of the fourth quarter of 1894, with the meteorological conditions of the preceding quarter, shows the prevailing direction of the wind to have been west (instead of southwest), the average velocity 3 miles per hour greater, the temperature 30.02 degrees lower, the rainfall .01 of an inch less, the absolute humidity much less, the relative humidity much more, the day and night ozone much less and the depth of water in the well at Lansing 14 inches less in the fourth quarter of 1894.

Compared with the preceding quarter (July, August and September), the reports from regular observers show a marked increase of diphtheria, influenza, pneumonia, pleuritis, bronchitis, tonsillitis and scarlet fever, and a marked decrease of cholera infantum, cholera morbus, dysentery, diarrhea, intermittent fever and inflammation of bowels in the fourth quarter of 1894.

The Weather and the Health in Michigan in the Fourth Quarter of 1894, Compared with the Average for the Fourth Quarters in the Eight Years 1886–1893.

A comparison of the meteorological conditions of the fourth quarter of 1894, with the average for the fourth quarters in the eight years, 1886-1893, shows that in 1894, the prevailing direction of the wind was the same (west), the velocity .8 of a mile per hour greater, the temperature was .65 of a degree higher, the rainfall was .97 of an inch less, the absolute and relative humidity were nearly the same, the day and night ozone were less and the depth of water in the well at Lansing was 11 inches less.

Compared with the average in the corresponding quarters in the eight years 1886-1893, the reports from regular observers indicate that typhoid

fever was more than usually prevalent, and that intermittent fever, typho-malarial fever, erysipelas, consumption, dysentery, pneumonia and remittent fever were less than usually prevalent in the fourth quarter of 1894.

SECRETARY'S REPORT OF DANGEROUS COMMUNICABLE DISEASES, OF WORK DONE IN THE OFFICE OF THE STATE BOARD OF HEALTH, AND OF THE CONDITION OF HEALTH GENERALLY IN MICHIGAN DURING THE QUARTER ENDING MARCH 31, 1895.

Dangerous Communicable Diseases.

The number of reports of outbreaks of dangerous communicable diseases in Michigan, received from all sources and filed, and concerning which action was taken by this office, during the quarter, are as follows: for diphtheria, 117; for scarlet fever, 195; for typhoid and typho-malarial fever, 76; for measles, 53; for small-pox, 12; and for consumption, 154. Total for the six diseases, 601.

The number of communications relative to dangerous communicable diseases, received and placed on file during the quarter, was 2,482.

TABLE 1.—FIRST QUARTER OF 1895.—*Showing the number of outbreaks of Diphtheria, Scarlet fever, Typhoid fever, Measles, Small-pox and Consumption, from January 1 to March 31, 1895, of which notice was received at the office of the Michigan State Board of Health; the per cent of reports, information concerning which was received through the Newspapers; the per cent of newspaper reports which were confirmed by the health officer; the per cent of newspaper reports which were denied by the health officer; and the per cent relative to which no reply was received from the health officer.*

Diseases.	Reports from *all* sources, Jan. 1 to Mar. 31, 1895.	Per cent of all reports which were obtained from the newspapers.	Per cent of newspaper reports which were confirmed by the health officer.	Per cent of newspaper reports which were denied by the health officer.	Per cent of newspaper reports to which the health officer made no reply to notice sent from this office.
Diphtheria	111	3	33	33	33
Scarlet fever	195	3	33	33	33
Typhoid fever	76	3	0	50	50
Measles	53	4	0	100	0
Small-pox	13	0	0	0	0
Consumption	154	0	0	0	0
Averages for the six diseases		2	23	46	31

Relative to dangerous communicable diseases, letters, written cards, and demands for weekly and final reports on cards, or in the form of the circular letter, were sent out during the quarter to the number of 2,084.

The "final" reports of outbreaks received and filed during the quarter were: for diphtheria, 109; scarlet fever, 191; typhoid and typho-malarial fever, 91; measles, 21; small-pox, 12; consumption, 2. Total for the six diseases, 426.

During the quarter, the local columns of 942 newspapers, have been looked over for reports of occurrence of communicable diseases. (This work is done by the clerk who acts as messenger and janitor, in the intervals of his performance of other duties.) This has resulted in giving this office information of the alleged occurrence of 3 outbreaks of diphtheria, 6 outbreaks of scarlet fever, 2 outbreaks of typhoid and typho-malarial fever, 2 outbreaks of measles. To what extent the reports of these alleged outbreaks were verified, is shown in the accompanying table.

Small-pox in Michigan in the first quarter of 1895.

Twelve new outbreaks of small-pox were reported during the quarter. These occurred in Bengal township, Clinton Co.; Southfield township, Oakland Co.; Plymouth village, Wayne Co.; Highland Park village, Wayne Co.; Mayville village, Tuscola Co.; Pontiac city; Royal Oak township, Oakland Co.; Hamtramck township, Wayne Co.; Grand Rapids city; Three Rivers village, St. Joseph Co.; Ypsilanti city and Watson township, Allegan Co. Of these outbreaks, final reports of those at Bengal, Southfield, Plymouth, Pontiac, and Royal Oak, have been received. In the outbreaks at Highland Park, Ypsilanti and Hamtramck the cases have all recovered, but no final reports of these three outbreaks have yet reached this office at this date (April 1, 1895). Relative to the alleged outbreaks at Mayville and Three Rivers, no reports have been received at this office, at this date (April 1, 1895), from either of these localities, since the "blue letter" was sent from this office, and it is inferred that there may have been no small-pox at either of these localities. (This has since been found to be true.)

April 1, small-pox is still present at Detroit, Grand Rapids, and Watson township.

The outbreak which began in Detroit in May, 1894, still continues. During the quarter ending March 31, 1895, there have occurred in that city, 77 new cases, and 26 deaths, which, with the 17 cases that were still sick at the close of the quarter ending December 31, 1894, make a total of 94 cases and 26 deaths, during the first quarter of 1895.

(From the beginning of the outbreak in May, 1894, up to April 1, 1895, there have occurred in the city of Detroit 217 cases and 60 deaths.)

In the ten outbreaks of small-pox, not including Detroit, and from which reports have been received during the quarter ending March 31, 1895, there have occurred 21 cases and only 1 death

In the five outbreaks, relative to which final reports have been received, the infection was in every instance restricted to the one house in which it first occurred.

Compiling, Editing, Proof-Reading, Printing, etc.

The compilation of reports from all sources, relative to Measles in Michigan in 1892 has been completed, and the work on proving the compilation for the article for the Annual Report has been commenced.

The compilation of reports from all sources relative to Diphtheria in Michigan in 1893, is practically completed, and the material for the tables for the article for the Report for 1894, has been collected.

The article "Scarlet Fever in Michigan in 1892" has been written, based upon the compilation, and will be ready for the printer as soon as proved.

The article "Diphtheria in Michigan in 1892" has been proved.

The article "Nuisances in Michigan in 1892" has been completed.

About one-half of the compilation of "Typhoid Fever in Michigan in 1892" has been proved.

Short articles on various subjects, have been written, based upon the compilations, as follows: Typhus Fever, Membraneous Croup, Erysipelas, Mumps, Alleged Anthrax, Puerperal Fever, Chicken-pox, Cholera (sporadic), Whooping-cough, Rötheln, Typho-pneumonia, and Small-pox.

Proof has been read on the Proceedings of the Union City Sanitary Convention, on the latter part of the article on "Meteorology in Michigan in 1892," and on the first portion of the article relative to Sickness Statistics in Michigan in 1892."

The work on printing the Annual Report for 1893 has been commenced and about ninety pages of the report have already been printed.

Making Diagrams, Tables, etc.

A table has been made, showing the numbers of cases of Sickness and Deaths from Diphtheria, Scarlet Fever and Small-pox, reported to have occurred in Detroit during each week of the years 1890-95 as reported to this office by the Health Officer of Detroit.

A Map—Distribution of Scarlet Fever in Michigan in 1892—has been made.

A large diagram (32 by 45 inches) has been made in India ink to illustrate the relative importance, in Michigan, of the principal communicable diseases—Consumption, Pneumonia, Diphtheria, Typhoid Fever, Scarlet Fever, Whooping-Cough, Measles, and Small-pox.

Hektograph Work.

Hektograph work to the number of 4,246 pages has been made, of which about 355 pages were relative to the small-pox situation in Michigan since January 1, 1895, being in the form of tabular statements. A large proportion of the remaining pages relates to public-health legislation in Michigan in 1895.

Accessions to the Library, Card-Cataloguing, etc.

About 60 books and pamphlets, and some 300 numbers of journals (weeklies, monthlies, quarterlies) have been received and entered in the library accession book of the office.

Work on the card-catalog of the library has been continued.

Work in connection with the financial accounts of the office has been continued.

Annual Reports from Health Officers and Clerks for 1894.

Annual reports for the year 1894 have been received from 1,170 health officers and from 1,145 clerks of townships, cities and villages in Michigan. These reports convey to this office information relative to the prevalence of each dangerous communicable disease, and the condition of health and health work in each jurisdiction.

On February 28, a "Second request for annual report," was sent to 1,392 health officers and clerks from whom no report had yet been received; and on March 31, a "Third request" was sent to the health officers of 215 localities from which no report from either health officer or clerk had been received.

Of the 1,578 localities in Michigan, including townships, cities and villages, annual reports have been received from 1,419, leaving at the end of this quarter 159 localities delinquent. Of these delinquent localities, 9 are townships which are either in a disorganized condition, or from which neither the name of a supervisor or clerk has been returned for several years.

Reports of Medical Practitioners in their jurisdictions, have been received from 531 clerks of townships, cities and villages.

Work on Meteorology, in First Quarter of 1895.

The regular tri-daily meteorological observations have been continued at this station, and a summary for each week and month during the quarter has been made for use in this office in connection with sickness statistics. The monthly summary has been sent at the end of each month to the Director of the Michigan Weather Service, formerly at Detroit, now at Lansing, for his use; it is sent by him to the Chief of the U. S. Weather Bureau at Washington, D. C.

Nearly all the exhibits for the Annual Report for 1894, have been computed.

Ozone test-paper (supply for three months) was sent to each of 17 meteorological observers in Michigan.

Meteorological registers for the last 9 months of 1894 have been received for each of 11 stations, examined and computed, barometer, relative and absolute humility excepted.

Diagrams have been made relating to: Average Temperature, Av. Daily Range of Temperature, Absolute and Relative Humidity, Per Cent of Cloudiness, Rainfall, Day and Night Ozone, Velocity of the Wind, Barometric Pressure at Stations in Michigan, and Velocity of the Wind at Lansing, all for year 1893; also diagrams—Relation of sickness from Pneumonia to the Av. Atmospheric Temp. for four months, Sept. to Dec., 1894, at Calumet, Mich., and
each of 25 years, 1869-93, p r 100,000 p
—Consumption, Diphther a and Crou
Measles, Small-pox, Who ping-Coug

Hektograph copies of a form for "Measurements of Ground-Water" have been made for use of Meteorological Observers for the Michigan State Board of Health.

A map was made, in photo-engraving ink, showing Spencer and Oakfield townships, Kent Co., and lakes No. 3 and 4 with dam at outlet of one of the lakes, whereby a nuisance was caused by overflow in consequence of said dam; also a map of the township of Jefferson, Hillsdale Co., showing lakes and rivers, drains and marshes, where an alleged nuisance was caused by the overflowing of low lands, by a dam in the city of Hillsdale.

Distribution of Publications, etc.

About 800 copies of the Proceedings of the last regular meeting (Jan. 11, 1895), have been distributed to: Members and ex-members of this Board, Sanitary Journal Exchanges, Meteorological Observers and exchanges, members of Board of Correction and Charities, health officers of cities and villages, presidents and secretaries of previous sanitary conventions, members of the Legislature, and to Sanitarians.

About 200 copies of the Proceedings of the regular meeting, held at Lansing, Oct. 12, 1894, have been distributed to sanitarians.

About 1,200 copies of the Proceedings of the Sceond Annual Conference of Michigan Health Officers, at Ann Arbor, and about 1,200 copies of the Proceedings of the Sanitary Convention held at Union City, have been distributed to: Members and ex members of this Board, sanitary journal exchanges, meteorological observers and exchanges, members of the Board of Correction and Charities, secretaries of other State Boards of Health, health officers of cities and villages, presidents and secretaries of previous sanitary conventions, and to Sanitarians. About 150 copies of the Proceedings of the Ann Arbor Conference were sent to members of the Legislature.

About 200 copies of the Annual Report of the Board for 1892 have been distributed to sanitarians in this and other States and Countries.

During the quarter 1,939 envelopes were addressed to 1,211 supervisors of townships, 294 presidents of villages, 294 clerks of villages, 70 mayors of cities and 70 clerks of cities. In each envelope was sent a circular letter of instruction and a blank form for the return of the name and post-office address of the health officer for the ensuing year, and a return envelope. At the same time and in the same envelope there was sent to each clerk of a city and to each supervisor of a township a blank to be handed to the clerk of the city or to the clerk of the township [illegible] purpose in keeping a record of each physician and each under- [illegible] racticing medicine in the township or city as the case may be; [illegible] time, in case there is an incorporated villa[illegible]ithin the to[illegible] pervisor of the township is sent an extra [illegible] keeping [illegible] hysicians and under-graduates, to be han[illegible] clerk of [illegible]

About the usual [illegible]rs of [illegible]on the [illegible]d prevention of the diffe[illegible] rou[illegible] are s[illegible] officers of localities in [illegible] ro[illegible] have [illegible] It was at the same time [illegible] f[illegible] off[illegible] mphlets be distributed [illegible] [illegible] s [illegible] and to such other [illegible] [illegible] ke[illegible] response to special re[illegible] [illegible] [illegible] gies of annual

reports, proceedings of sanitary conventions, proceedings of meetings of the board, and pamphlets on the restriction and prevention of the dangerous communicable diseases, have been sent where is was thought likely to benefit public health interests.

The usual record of distribution of publications has been kept.

Transportation of Corpses Dead of Tuberculosis.

In a letter dated April 11, 1895, John L. Freeman, General Baggage Agent of the Lake Shore and Michigan Southern Railway Co., wrote to know how bodies dead of Consumption were to be treated by the railroad authorities, the agent at Grand Rapids, Michigan, having received a corpse dead of Consumption the transit permit reading "Contagious Disease."

The following is the Secretary's reply:

STATE BOARD OF HEALTH, MICHIGAN,
OFFICE OF THE SECRETARY,
Lansing, April 13, 1895.

John L. Freeman, General Baggage Agent, Lake Shore and Mich. Southern Ry. Co., Cleveland, Ohio:

DEAR SIR—Your letter of April 11, transmitting letter of March 29 from J. W. Lawton, Grand Rapids, relative to corpse dead of consumption, is before me.

The State Board of Health of Michigan, Sept. 30, 1893, adopted a resolution "That hereafter, consumption (and other diseases due to the *Bacillus tuberculosis*) shall be included in the official list of 'diseases dangerous to the public health.'" In this resolution the question of isolation of the patient is not mentioned, and the question of the spread of the disease from a corpse has never been acted upon by this Board.

This subject has not reached such a definite stage that I can give you definite advice. I think most sanitarians still hold to the belief that there is not much danger of consumption being spread by a corpse, yet, inasmuch as consumption is the most dangerous disease, I incline to the view that it would be safest for the public and also for your company to include bodies of those dead from consumption under sections 2 and 3, Rule 52, adopted by the American Association of General Baggage Agents, at Mackinaw, July, 1892.*

Very respectfully,

HENRY B. BAKER,
Secretary.

Is Testing Eyes and Fitting Glasses Practicing a "Branch of Medicine?"

During the quarter the Secretary has received letters asking whether or not testing eyes and fitting glasses is a branch of medicine, and whether persons doing such work should not be required to comply with the State law regulating the practice of medicine. It is claimed by oculists, that a lens is a surgical appliance for overcoming an optical defect, and that he who tests eyes and adjusts glasses is practicing a branch of medicine, and should register in the office of the county clerk in accordance with the State law regulating the practice of medicine, before he or she is legally authorized to practice this branch of medicine. The opinion of the State Board of Health has been asked, and the subject

* Section two of Rule 52, designates how bodies dead from contagious, infectious, or communicable diseases, must be prepared before the railroads will accept them for transportation.

Section 3 provides that no infected clothing shall accompany the body except that which is in the coffin or box, and also requires affidavits stating how the body has been prepared and kind of coffin or casket used.

should have been placed before the Board had there been opportunity. During the interval of a meeting the Secretary made the following reply to a letter on this subject:

STATE BOARD OF HEALTH, MICHIGAN,
OFFICE OF THE SECRETARY,
Lansing, Feb. 21, 1895.

A. Overfield, M. D., Houghton, Michigan:

DEAR DOCTOR:—I send you by this mail a copy of the pamphlet proceedings of this Board at its meeting in April, 1894, in which you will find marked paragraphs relative to the subject of your letter to me Feb. 19.

Replying to your letter of Feb. 19, I send you herewith a copy of the law regulating the practice of medicine in Michigan. It provides that every person practicing medicine and surgery "in all [any of ?] its departments" shall be a graduate of a legally-authorized medical college in this or any other country, and shall file with the county clerk a statement relative to his medical education and graduation. The question would be whether testing and fitting the eyes with glasses, is one of the "branches" or "departments" of medicine. If so, the individual could, perhaps, be punished under the State law. I presume it would rest with the court, or the jury in case a jury trial was had, to decide that point. There is no telling how they might decide it. For myself I am inclined to believe such practice is a branch of medical practice, and should be regulated by the law relative to the practice of medicine.

Very respectfully,

HENRY B. BAKER,
Secretary.

Small-pox in Watson, Allegan Co., Investigation of Outbreaks of Communicable Diseases.

March 21, 1895, the Secretary of the State Board of Health received a telegram from Allegan, Michigan, as follows:

"Small-pox reported here, disputed, can you send expert immediately? —*John Germain, health officer of Watson.*"

This was received very late at night. The Secretary telegraphed as follows: "Isolate patient, vaccinate all exposed. Will try to send expert tomorrow."

March 22, the Secretary telegraphed Doctor George H. Granger, member of State Board of Health, as follows: "Small-pox reported at Watson, Allegan County, diagnosis disputed, want expert immediately, will you go and investigate?" The following reply was received: "Cannot leave my business. Have several very sick patients.—*Geo. H. Granger.*"

The same telegram sent to Doctor Granger was then sent to Doctor Victor C. Vaughan, member of State Board of Health, and reply was received as follows: "Cannot go. Ask Mulheron.—*V. C. Vaughan.*"

The same telegram was then sent to Doctor Samuel G. Milner, member of State Board of Health, and a reply was received as follows: "I cannot go, but Hazlewood will.—*Milner.*"

A similar telegram was sent to Mason W. Gray, M. D., member of State Board of Health, and the following reply was received: "Cannot go, try some one else.—*Mason W. Gray.*"

March 22, the following telegram was sent to John Germain, health officer of Watson, Allegan County, Michigan: "No member of Board could go. Doctor Cattermole of this office will reach Allegan 8:16 tomorrow morning.—*Baker, Secretary.*"

March 23, Doctor Cattermole telegraphed the Secretary of the State Board of Health, as follows: "One case diagnosed Varioloid. Sick ten

days. Many persons exposed, but active measures are being taken in vaccination and isolation. Will start home tonight."

This experience teaches the difficulty of relying upon members of the State Board of Health, who are engaged in active practice as physicians, for service as Contagious-Disease Inspectors. In this instance every medical member of the Board was asked to go, and every one found it impracticable to do so. (It was impracticable for the Secretary to go, because of pressing official duties in the office of the Board, and especially as the Correspondence Clerk chanced to be absent.) This is only one of many instances, which are being constantly repeated, in which the need of a State Communicable-Disease Inspector is rendered imperative.

[As indicated in the foregoing, Doctor George H. Cattermole of the Office of the State Board of Health was sent to investigate this case of reported small-pox. His report is found printed on subsequent pages of this Report in connection with the article on "Small-pox."]

Work in Connection with Sickness Statistics.

During the first quarter of 1895, 2,205 blank postal report cards, 147 record-books and 27 hektograph circular letters regarding weekly card-reports, have been mailed to 139 health officers and regular correspondents, 1,202 weekly card-reports have been received and entered on the register; 53 copies of the hekotgraphed weekly bulletin, "Health in Michigan," were mailed each week, and 107 copies of the monthly bulletin, "Health in Michigan" have been hektographed and mailed each month. These bulletins have been consolidated for this quarterly report. The compilation of the weekly card-reports of sickness during the year 1893, for the annual report for 1894, have been completed during this quarter.

Health in Michigan in the First Quarter of 1895. Communicable Diseases.

Compared with the preceding quarter (October, November and December, 1894), reports from all sources show *typhoid fever* to have decreased by an average of *seventy-two* places, *diphtheria* to have decreased by an average of *twenty-four* places, *measles* to have increased by an average of *thirteen* places and *scarlet fever* to have increased by an average of *one* place. There were the *same* number of cases of *small-pox* as in the preceding quarter.

Meteorology at one Central Station, and Sickness throughout Michigan from all Causes, First Quarter of 1895, Compared with the Preceding Quarter.

A comparison of meteorological conditions of the first quarter of 1895, with the meteorological conditions of the preceding quarter, shows the prevailing direction of the wind to have been the same (south-west), the average velocity 4.1 miles per hour greater, the temperature 47.28 degrees lower, the rainfall .11 of an inch more, the absolute humidity much less, the relative humidity slightly less, the day and night ozone less, and the depth of water in the well at Lansing 22 inches less in the first quarter of 1895.

Compared with the preceding quarter (October, November and December), the reports from regular observers show a marked increase of influenza, pleuritis and pneumonia, and a marked decrease of remittent fever, diarrhea and intermittent fever in the first quarter of 1895.

The Weather and the Health in Michigan in the First Quarter of 1895, Compared with the Average for the Nine Years, 1886–1894.

A comparison of the meteorological conditions of the first quarter of 1895, with the avearge for the first quarters in the nine years, 1886-1894, shows that in 1895, the prevailing direction of the wind was the same, (south-west), the velocity was 1.2 miles per hour greater, the temperature was 5.03 degrees lower, the rainfall was .52 of an inch less, the absolute and relative humidity and the day and night ozone were all less, and the depth of water in the well at Lansing was 21 inches less.

Compared with the average in the corresponding quarters in the nine years 1886-1894, the reports from regular observers indicate that erysipelas, remittent fever and intermittent fever were more than usually prevalent, and that consumption and inflammation of bowels were less than usually prevalent in the first quarter of 1895.

SECRETARY'S REPORT OF DANGEROUS COMMUNICABLE DISEASES, OF WORK DONE IN THE OFFICE OF THE STATE BOARD OF HEALTH, AND OF THE CONDITION OF HEALTH GENERALLY IN MICHIGAN DURING THE QUARTER ENDING JUNE 30, 1895.

Dangerous Communicable Diseases.

The number of reports of outbreaks of dangerous communicable diseases in Michigan, received from all sources and filed, and concerning which action was taken by this office, during the quarter, are as follows: for diphtheria, 84; for scarlet fever, 131; for typhoid and typho-malarial fever, 41; for measles, 74; for small-pox, 5; and for consumption, 54. Total for the six diseases, 388.

The number of communications relative to dangerous communicable diseases, received and placed on file during the quarter, was 1,714.

Relative to dangerous communicable diseases, letters, written cards, and demands for weekly and final reports on cards, or in the form of the circular letter, were sent out during the quarter to the number of 1,344.

The "final" reports of outbreaks received and filed during the quarter were: for diphtheria, 73; scarlet fever, 130; typhoid and typho-malarial fever, 34; measles, 36; small-pox, 7; consumption, 0. Total for the six diseases, 280.

During the quarter, the local columns of 889 newspapers, have been looked over for reports of occurrence of communicable diseases. (This work is done by the clerk who acts as messenger and janitor, in the intervals of his performance of other duties.) This has resulted in giving this office information of the alleged occurrence of 3 outbreaks of diphtheria, 8 outbreaks of scarlet fever, 0 outbreaks of typhoid and typho-malarial fever, 4 outbreaks of measles, 2 outbreaks of consumption, and 1 outbreak of small-pox. To what extent the reports of these alleged outbreaks were verified, is shown in the accompanying table:

TABLE 1.—SECOND QUARTER OF 1895.—*Exhibiting the number of outbreaks of Diphtheria, Scarlet fever, Typhoid fever, Measles, Small-pox, and Consumption, from April 1 to June 30, 1895, of which notice was received at the office of the Michigan State Board of Health; the per cent of reports, information concerning which was received through the Newspapers; the per cent of newspaper reports which were confirmed by the health officer; the per cent of newspaper reports which were denied by the health officer; and the per cent relative to which no reply was received from the health officer.*

Diseases.	Reports from *all* sources, April 1 to June 30, 1895.	Per cent of all reports which were obtained from the newspapers.	Per cent of newspaper reports which were confirmed by the health officer.	Per cent of newspaper reports which were denied by the health officer.	Per cent of newspaper reports to which the health officer made no reply to notice sent from this office.
Diphtheria	89	4	0	33	67
Scarlet fever	131	6	25	13	63
Typhoid fever	41	0	0	0	0
Measles	74	5	50	0	50
Small-pox	5	20	100	0	0
Consumption	54	4	0	0	100
Averages for the six diseases		5	28	11	67

Small-pox in Michigan in the second quarter of 1895.

Five new outbreaks of small-pox were reported during the quarter. These occurred in Brownstown township, Wayne Co.; Battle Creek city; Olivet village; Danby township, Ionia Co.; and Battle Creek city; of these outbreaks, final reports of those at Brownstown township and the first outbreak at Battle Creek have been received. Final reports have also been received from the following outbreaks which began during the first quarter of 1895, Highland Park village; Hamtramck township, Wayne Co.; Grand Rapids city; Ypsilanti city; and Watson township, Allegan Co.

July 1, small-pox is still present at Detroit, Olivet, Danby township, and Battle Creek.

The outbreak which began in Detroit in May, 1894, still continues. During the quarter ending June 30, 1895, there have occurred in that city, 31 new cases, and 7 deaths, which, with the 17 cases that were still sick at the close of the year 1894, and the 77 cases, and 26 deaths which occurred during the first quarter of 1895, make a total of 125 cases and 33 deaths during the first six months of 1895. During the first six months of 1895, there have occurred in the city of Detroit, 108 new cases and 33 deaths; at the end of this quarter there existed one case.

(From the beginning of the outbreak in May, 1894, up to July 1, 1895, there have occurred in the city of Detroit 248 cases and 67 deaths.)

In the five new outbreaks of small-pox in Michigan which occurred during the quarter ending June 30, 1895, there have occurred 9 cases and 3 deaths.

In 10 out of the 12 outbreaks, relative to which final reports have been received, during the six months ending June 30, 1895, the infection was restr cted to the one house in which it first occurred.

Compiling, Editing, Proof-Reading, Printing, etc.

The compilation of reports from all sources relative to Diphtheria in Michigan in 1893, has been completed, and the proving of the compilation commenced.

The compilation of reports from all sources relative to Scarlet Fever in Michigan in 1893, is nearly completed.

Articles on the following subjects, for the Annual Report for 1893, (but relating to the year 1892), have been prepared for the printer: Typhoid Fever, Measles, Cholera Infantum, Glanders, Alleged Hydrophobia, Consumption, Poisoning from Canned Meats and Fish, Injuries and Loss of Life and Property from the use of Kerosene, and the same from the use of Gasoline.

In addition to the foregoing, articles written, or partly written, in previous quarters, for the Report for 1893 (but relating to the year 1892), were completed and proved and made ready for the printer: Scarlet Fever, Typhus Fever, Membraneous Croop, Erysipelas, Mumps, Anthrax, Chicken-pox, Cholera, Whooping-Cough, Rötheln, Typho-Pneumonia, Puerperal Fever and Small-pox.

The proceedings of the Charlotte Sanitary Convention have been made ready for the printer.

"Part I" of the Annual Report for 1893, is nearly ready for the printer.

The pamphlet on the "Work of Health Officers," etc., has been revised and made to include amendments to the public-health laws which affect the duties of health officers. After revision, the work was submitted to the members of the Board for amendment or approval.

The pamphlet on the Restriction and Prevention of Scarlet Fever has been revised to include amended laws. After revision it was submitted to the members of the Board for further amendment or approval.

The pamphlet on the Restriction of Measles has been revised, and submitted to the members of the Board for further amendment or approval.

Proof has been read on the Proceedings of the Charlotte Sanitary Convention, on the remainder of the article relative to "Sickness Statistics in Michigan in 1892," and on the article relative to "Diphtheria in Michigan in 1892." Proof has also been read on the pamphlet "Work of Health Officers and of Local Boards of Health," the pamphlet relative to the Restriction and Prevention of Scarlet Fever, and on the pamphlet on the Restriction of Measles.

The printing on the Annual Report for 1893 has been continued.

Work on Meteorology.

The regular tri-daily meteorological observations have been continued at this Station, and a summary for each week and month during the quarter has been made for use in this office in connection with sickness

statistics. The monthly summary has been sent to the Local Forecast Official at Detroit, to the Director of the Michigan State Weather Service at Lansing, and to the Chief of the U. S. Weather Bureau at Washington, D. C.

The relative humidity figures were called in on the meteorological registers for each month in the year 1894, at 7 stations, and the absolute humidity up to and including a part of August, 1894, for the same stations.

Ozone test-paper was sent to each of 16 meteorological observers in Michigan.

Making Diagrams, etc.

Diagrams Nos. v., xii., xiv., and xv. on Meteorology, and Nos. 1, 2, 3, 4, and 5 on Weekly Reports of Sickness in Michigan in 1893, were made, ready to be sent to the photo-engravers.

Diagrams and maps relative to the following subjects were made:—

"Per cent of Deaths from Diphtheria in Michigan with certain periods of age, 21 years, 1872-92."

"Reported Deaths from Diphtheria in Michigan, during each of the 25 years, 1868-92."

Map—"Showing Localities in Michigan to which Diphtheria was spread from the first Locality," etc.

"Typhoid Fever in Michigan, 1892," cases and deaths; where isolation and disinfection were enforced, and where those measures were neglected.

Map—"Showing overflowed and Wet Lands, constituting an Alleged Nuisance in the Township of Jefferson, Hillsdale Co., Mich."

"Deaths from Typhoid Fever per 100,000 persons living during each of the years 1868-92."

"Low Water in Wells and Sickness from Typhoid Fever in Michigan, 14 years, 1878 and 1880-92."

"Number of Deaths from Measles per 100,000 persons living during each of the 25 years, 1868-92, in Michigan."

"Measles in Michigan, 1892." Cases and Deaths, where Isolation and Disinfection were enforced, and where those measures were neglected.

"Temperature of Water in Well in Capitol yard, Lansing, Mich., and Sickness from Typhoid Fever in the State, by months, for a period of 9 years, 1885-93."

The diagram "Deaths in Mich., 10 years, 1884-93," was retouched and sent to the photo-engravers.

Hektograph Work.

A large amount of hektograph work has been done during the quarter. There were about 2,657 pages in all, of which about 1,400 were incident to the proposed abolition of the Board, including letters to members of the Board, statements of the work of the Board, refutations of false statements against the office and the Board, etc. About 150 pages were relative to public-health legislation, about 200 pages relative to small-pox in Michigan, and about 50 pages were relative to immigrants entering Michigan, who had been liable to have been exposed to some dangerous com-

municable disease. Some of the hektograph work related to the revised edition of the pamphlet on the restriction and prevention of scarlet fever, and a number of pages related to the proposed new leaflet and circular to teachers, and school superintendents, giving instructions relative to the modes by which the dangerous diseases are spread, and the best methods for the restriction and prevention of such diseases.

Accessions to the Library, Card-Cataloguing, etc.

About 94 books and pamphlets, and some 362 numbers of journals (weeklies, monthlies and quarterlies) have been received and entered in the library accession book.

The work on the card-catalogue of the library has been continued to a limited extent.

Work in connection with the financial accounts of the office has been continued.

Names and Addresses of Health Officers for 1895-96.

A circular letter of instruction and a blank form for the return of the name and address of the health officer, together with an addressed envelope, had been sent* to the supervisors of townships, presidents and clerks of villages, mayors and clerks of cities. June 3-7 a *second demand* for the return of the name and address of the health officer was made to 680 clerks of townships, cities and villages from which no return had been made upon the first demand.*

There have been returned to this office the names and post-office addresses of 1,325 health officers of townships, cities and villages. These facts have been entered on the health-officer books, and the reports have been placed on file. To each of 1,066 health officers returned, there have been sent a set of pamphlets on the restriction and prevention of the different dangerous diseases, two copies of the outbreak report blank, and one sample copy of the blank for keeping a local record of the cases of diseases dangerous to the public health. A similar set of pamphlets, leaflets, blanks, etc., was sent to the person making the return of each of the 1,066 health officers.

A copy has been made of the list of supervisors and clerks as they are returned to the Office of the Secretary of State.

Distribution of Publications, etc.

About 108 copies of the printed proceedings of the Regular Meeting of the Board, at Lansing, April 12, 1895, have been sent to members and ex-members of this Board, and to Sanitary journal exchanges.

About the usual numbers of pamphlets on the restriction and prevention of the different dangerous diseases were sent to the health officers of localities in which dangerous diseases have been reported. It was at the same time requested of these health officers that the pamphlets be distributed to the *neighbors of the person sick with such a disease* and to such other persons as the pamphlets would be likely to benefit.

* These were sent out during the last day or two of last quarter.

In response to special requests of sanitarians in this and other states, copies of annual reports, proceedings of sanitary conventions, proceedings of meetings of the Board, and pamphlets on the restriction and prevention of the dangerous communicable diseases, have been sent where it was thought likely to benefit the public-health interests.

The usual record of distribution of the publications has been kept.

The yearly invoice of pamphlets, paper, envelopes, etc., on hand July 1, 1895, has been taken and placed in tabular form.

Public-Health Legislation in Michigan in 1895.

(For Public Health Legislation, see Report "History of Legislation in Michigan in 1895," printed on subsequent pages of this Report.)

Work in Connection with Sickness Statistics.

During the second quarter of 1895, 2,743 blank postal-report cards, 204 record-books and 93 hektographed circular letters regarding weekly card-reports, have been mailed to 202 health officers and regular correspondents; 1,104 weekly card-reports have been received and entered on the register; 52 copies of the hektographed weekly bulletin, "Health in Michigan," were mailed each week, and 112 copies of the monthly bulletin, "Health in Michigan," have been hektographed and mailed each month. These bulletins have been consolidated for this quarterly report.

Health in Michigan in the Second Quarter of 1895. Communicable Diseases.

Compared with the preceding quarter (Jan., Feb. and March, 1895), reports from all sources show *scarlet fever* to have decreased by an average of *thirty-seven* places, *typhoid fever* to have decreased by an average of *twenty-two* places, *diphtheria* to have decreased by an average of *eighteen* places, *small-pox* to have decreased by an average of *five* places and *measles* to have increased by an average of *fifteen* places in the second quarter.

Meteorology at one Central Station, and Sickness throughout Michigan from all causes Second Quarter of 1895, Compared with the Preceding Quarter.

A comparison of meteorological conditions of the second quarter of 1895, with the meteorological conditions of the preceding quarter, shows the prevaling direction of the wind to have been the same (south-west), the average velocity 3.1 miles per hour less, the temperature 38.98 degrees higher, the rainfall .04 of an inch less, the absolute humidity much more, the relative humidity slightly less, the day and night ozone each slightly less, and the depth of water in the well at Lansing 4 inches less (no water in the well on June 15) in the second quarter of 1895.

Compared with the preceding quarter (January, Feb. and March), the reports from regular observers show a marked increase of erysipelas

intermittent fever and diarrhea, and a marked decrease of pneumonia, influenza and pleuritis in the second quarter of 1895.

The Weather and the Health in Michigan in the Second Quarter of 1895, Compared with the Average for the Nine Years, 1886-1894.

A comparison of the meteorological conditions of the second quarter of 1895, with the average for the second quarters in the nine years, 1886-1894, shows that in 1895, the prevailing direction of the wind was southwest instead of westerly, the velocity was .1 of a mile per hour less, the average temperature was 3.11 degrees higher, the rainfall was 1.83 inches less, the absolute and relative humidity and the day and night ozone were all less, and the depth of water in the well at Lansing was 30 inches less.

Compared with the average in the corresponding quarters in the nine years, 1886-1894, the reports from regular observers indicate that influenza and scarlet fever were more than usually prevalent, and that measles, intermittent fever, consumption and whooping-cough were less than usually prevalent in the second quarter of 1895.

GENERAL REPORT OF WORK IN THE OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH DURING THE FISCAL YEAR ENDING JUNE 30, 1895.

Much of the work of the Office naturally groups itself under three closely related heads—the collection of information, the compilation and elaboration of information, and the dissemination of information. In the following outline that grouping is adhered to so far as is practicable without repetition.

COLLECTION AND COMPILATION OF INFORMATION.

RETURNS OF NAMES AND POSTOFFICE ADDRESSES OF HEALTH OFFICERS.

There is a local board of health in every township, and in every incorporated city and village in Michigan.

Every local board of health in Michigan is required by law to appoint and constantly have a health officer, and to report his name and address to the Secretary of the State Board of Health at Lansing.

Blanks for the return of the names and addresses of health officers are sent out by the Secretary of the State Board of Health to the local officers about the first day of April, the law (§1634 Howell's Statutes) requiring the appointment and return to be made "within thirty days after the annual township meeting in each year."

In the secretary's quarterly report of work done during the second quarter of 1895, printed on preceding pages of this volume, is an

account of the collection of this information relative to health officers in Michigan in 1895–96.

In April, 1895, the usual demand was made upon supervisors of townships, presidents and clerks of villages, and mayors and clerks of cities, for the return of the names and postoffice addresses of health officers to serve in 1895-96. The circular and blank forms are similar to those printed on pages xiii-xiv of the Report of this Board for 1884. In June, 1895, a second demand was sent to localities from which no return had been made in response to the demand in April. On the outbreak of a dangerous communicable disease in a township, city or village in which no health officer had been reported, a third and even a fourth demand for the appointment of such officer, and the return of his name has been made.

Through the systems of reports to the State Board of Health by its corps of correspondents, as well as by the local health officers, and by a systematic searching of the local columns of the country newspapers published in Michigan, the secretary of the State Board often receives information of an outbreak of a communicable disease, and desires to communicate at once with the health officer; but if no health officer has been appointed in that locality, or no return of such appointment has been made, delay occurs, and before the secretary of the State Board can get into correspondence with the delinquent local board of health and a health officer can be chosen, the disease may spread widely within or without the limits of the village or township, with unnecessary sickness and loss of life.

It should be said that there is an increasing tendency to comply with this law, and local boards now generally act promptly and coöperate cordially with the State Board of Health in its endeavors to prevent the spread of dangerous communicable diseases.

SPECIAL REPORTS RELATIVE TO DANGEROUS COMMUNICABLE DISEASES.

Every health officer is supplied with blanks "L" from this office, for reporting outbreaks of diphtheria, typhoid fever, scarlet fever, small-pox, measles, etc. (dangerous communicable diseases) to the secretary of the State Board of Health, as required by law.

Upon the receipt of the report of an outbreak of such disease, blank "M" for weekly reports during the outbreak, are sent, with a circular letter ("Blue Letter"), also a number of pamphlets containing instructions for the suppression of the disease. These pamphlets are to be distributed to the neighbors of the family in which the disease is, in order to obtain their coöperation with the health officer.

About 1,974 outbreaks of such diseases were thus attended to during the fiscal year ending June 30, 1895.

Later a blank is sent to each such locality for a final report at the close of the outbreak, stating just what was done for the restriction of the disease, and with what result,—the number of cases and deaths, households invaded, what disinfectants were used, in what quantities, and other facts supplying important data for future efforts.

The facts thus collected are compiled for publication in the Annual Report of the Secretary of the State Board of Health. In this Annual Report will be found the report of such facts relative to the dangerous communicable diseases in Michigan during the year 1894.

SICKNESS STATISTICS, WEEKLY POSTAL-CARD REPORTS OF ALL IMPORTANT DISEASES IN 1894-95.

The weekly postal-card reports of diseases, sent on cards furnished by the State Board of Health, have been received from health officers of cities and villages, and other leading physicians, who contribute this valuable information from different parts of the State. The plan of these weekly card-reports is stated on pages 82 and 83 of the Report for 1894; on page 83 is an example of these reports properly filled out. When a report of a new health officer of a city or village is received, a printed letter, number [180], with a circular [129] describing the plan of the reports, and transmitting supplies for making them, is sent to said health officer.

A list of observers of diseases for the calendar year 1894 and a compilation of their reports, with a study of relations of sickness to climatic conditions is printed in this Report. The sickness statistics of Michigan, based upon these weekly reports by the leading physicians in the State, are probably the most important sickness statistics in the world.

They are also made especially useful for the purpose of studying the causation of diseases, by reason of the excellent system of meteorological statistics which have been collected during such a long series of years as to make them exceedingly useful for such combinations.

ANNUAL REPORTS BY HEALTH OFFICERS FOR THE YEAR ENDING DEC. 31, 1894.

In January, 1895, a circular [218] was sent to the health officer of each township, city and village in the State, about 1,581 in all, transmitting a blank form [I] for use in making his annual report to this Office. This circular was substantially the same as circular [65], which is printed on pages viii-ix of the Report for 1884. Blank form [I], for reports of health officers, is printed in former Reports. With the circular [218] was also transmitted a blank for a copy of a record of diseases dangerous to the public health, similar to the blank which is printed, reduced in size, on page 271 of the Report for 1882.

Where the name of the health officer had not been returned to this office, the blanks were sent to the president of the village, the mayor of the city, or the supervisor of the township, according as the vacancy occurred in a village, city, or township.

ANNUAL REPORTS BY CLERKS OF LOCAL BOARDS OF HEALTH FOR THE YEAR ENDING DEC. 31, 1894.

At the same time (January, 1895) that the circulars and blank forms were sent to the health officers, a circular [217] asking for a report, and a blank form [J] on which to make a report, were sent to the clerk of the local board of health of each township, city and village in the State, about 1,581 in all. A blank form for a copy of his record of cases of diseases dangerous to the public health was also sent; the circular and blank form sent to the clerk were similar to those sent to the health officer, except that they were not so explicit in questions relating to sickness and deaths.

RETURN OF NAMES OF MEDICAL PRACTITIONERS.

About January 1, 1895, blanks for the return of names of Medical Practitioners were sent to each of the clerks of the townships, cities and villages, about 1,581 in number. An example of these blanks is printed on page XI of the Report of the Board for 1888.

METEOROLOGICAL REPORTS.

A list of meteorological observers for the calendar year 1894, with a statement of what registers were received from each, is printed in this Report. The reports are summarized in an article in this Report on the Principal Meteorological Conditions in Michigan in the year 1894, pages 1-80. The data are of great value for the purposes of studying the causes of diseases. The observations made at the office of the Board, at Lansing, have been summarized weekly, and a copy kept on file in the Office.

DISSEMINATION OF INFORMATION.

PUBLISHED LIST OF NAMES AND ADDRESSES OF HEALTH OFFICERS.

The names and addresses of 1,325 health officers in Michigan, to serve in 1895-6, were collected and recorded in the office; but because of pressure of work in the office the customary list of these health officers was not printed.*

DISTRIBUTION OF INFORMATION HOW TO RESTRICT AND PREVENT DANGEROUS DISEASES.

Whenever information is received of the occurrence of diphtheria, scarlet fever, measles, small-pox, typhoid fever, or typho-malarial fever, copies of a document on the restriction and prevention of the disease reported are immediately sent to the health officer, with a request that he distribute them where they will be likely to be read; and it is suggested that the neighbors of those families in which the sickness occurs would be most likely to read them at such times of danger; and it is thought that after reading them they will be most likely to coöperate with the local health officer for the restriction of the diseases. Thousands of pamphlets on each of the most dangerous communicable diseases are distributed by the State Board in this manner—in localities where the disease treated of in the pamphlet is present. They are being distributed in this way all the time, because there is no time when the State is free from scarlet fever or diphtheria, these being among the most important of the dangerous communicable diseases in Michigan. Copies of the documents on diphtheria, scarlet fever, and small-pox, in German or in Dutch, are also sent when it is thought they can be used to advantage. Owing to frequent requests for documents in French, Polish, Swedish and Danish-Norwegian, translations of a leaflet on contagious diseases [47] have been

* During the last quarter of 1895 a hektograph list of health officers serving in 1895 and 6 was made, for use of members of this Board and for use in the office of the Secretary.

made into each of these languages, and copies are sent to local boards of health when requested.

A record is kept of reports received and of correspondence relative to each outbreak of a dangerous communicable disease of which the office receives information. A compilation of such information relative to several of the most important diseases is published in this volume.

PRINTING AND DISTRIBUTION OF THE SECRETARY'S ANNUAL REPORT.

Comparatively few copies of the Annual Report of the secretary are published. The whole number published is not as large as the whole number of officers and members of local boards of health in Michigan. Only about six thousand copies of the Reports are published for all purposes. A little over half of these (3,500 copies) are at the disposal of the State Board of Health. These reports are used in exchange with sanitary journals, with other State Boards of Health, with boards of health in other cities and countries, with State and sanitary libraries, and to supply physicians in Michigan who contribute to the work of the Board. Michigan is a great and prosperous State, and it is believed that it is made richer, not poorer, by the influences exerted by the publications of the Michigan State Board of Health.

PRINTING AND PUBLISHING PAMPHLETS, LEAFLETS AND DIAGRAMS OF INFORMATION.

In July, 1894, the little two-page slip relative to consumption was printed to the number of 5,000 copies. In March, 1895, another edition of 10,000 copies of the slip was printed. This slip is printed on pages of this report, in connection with the article on "Consumption."

So many requests were being made for the law regulating the practice of medicine in Michigan, it was thought best to reprint it. Accordingly in July, 1894, the law (Act No. 167, laws of 1883, as amended by Act 268, laws of 1887) was reprinted to the number of 500 copies.

In July, 1894, a new circular [213] was planned which would request of local health officers and others special reports relative to consumption. The circular covered only one side of a half note sheet and was printed to the number of 500 copies. This circular is reproduced on subsequent pages of this Report, in connection with the article on "Consumption."

In August, 1894, 2,000 copies of the two-page leaflet diagram "Deaths in Michigan, 10 years, 1876-87" on one side and "Pathogenic Micro-Organisms 'Germs' of Disease" on the other side, were reprinted. In March, 1895, another edition of 2,000 copies was printed.

In August, 1895, the two-page leaflet diagram "Lives Saved by Public Health Work" in Michigan, and "Isolation and Disinfection Restricted Scarlet Fever and Diphtheria in Michigan during the five years 1886-90" was printed to the number of 3,000 copies. In March, 1895, another edition of 2,000 copies was printed.

In August, 1894, the two-page leaflet diagram with "Isolation and Disinfection Restricted Scarlet Fever in Michigan in 1890" and "Isolation and Disinfection Restricted Scarlet Fever in Michigan in 1891" was printed to the number of 2,000 copies. In March, 1895, another edition of 2,000 copies was printed.

In August, 1894, the two-page leaflet diagram with "Isolation and Disinfection Restricted Diphtheria in Michigan in 1889" and "Isolation and Disinfection Restricted Diphtheria in Michigan in 1891" was printed to the number of 1,000 copies. In March, 1895, an edition of 2,000 copies was printed.

In August, 1894, the two-page leaflet diagram with "Low Water in Wells and Sickness from Typhoid Fever" on one side, and the diagram "Typhoid Fever and Sewers" in Munich and other cities, was printed to the number of 1,000 copies. In March, 1895, another edition of 2,000 copies was printed.

In August, 1894, the diagrammatic two-page leaflet "Chart I" and "Chart II," showing the relation of typhoid fevers to sewerage and water-supply in cities of this and other countries, was printed to the number of 1,000 copies. In March, 1895, another edition of 2,000 copies was printed.

In September, 1894, an edition (8,000 copies) of the four-page leaflet 124 "The Prevention of Typhoid Fever" was printed.

In January, 1895, the two-page leaflet diagram "Isolation and Disinfection Restricted Typhoid Fever in Michigan in 1890" and "Isolation and Disinfection Restricted Typhoid Fever in Michigan in 1891" was printed to the number of 1,000 copies.

In February, 1895, a new circular [223], asking for special final reports relative to consumption, was planned and 500 copies printed. The circular is as follows:—

[223]

MICHIGAN STATE BOARD OF HEALTH,
OFFICE OF THE SECRETARY,
Lansing, Mich., ...189..

Health Officer of.....

DEAR SIR:—A special final report relative to an outbreak of.....in your jurisdiction has.....been received. Such reports when properly filled out are of great value in determining the best methods for preventing and restricting communicable diseases, but omissions or contradictions in them detract greatly from their value, and render their compilation very difficult, if not impossible. If the information is in its proper place on the blank form, its compilation is comparatively easy, but it is difficult and sometimes impossible to compile from letters which have to be read through for each separate point compiled. Therefore a letter will not serve the purposes for which the final report is needed.

It is important that we learn, by means of the final report, the whole number of cases, and of deaths, date when the case first was taken sick, and when the last case died or recovered; whether or not the fumigation by burning sulphur is efficient as a disinfectant, and what quantity of sulphur is required to accomplish disinfection. *The Law* (Act 137, Laws of 1883), *requires the health officer to disinfect*, therefore it is possible in every case for the health officer to know just how much sulphur is used; but if the exact quantity "per thousand cubic feet of air-space" cannot be stated, an estimate of the quantity used for each room should be made and stated in the report in connection with the statements of the length, breadth and height of each room fumigated.

In your above-mentioned report, the items which are marked on the enclosed blank are omitted, incomplete or otherwise unsatisfactory.

A blank not filled cannot be compiled the same as if filled with a "0," because, if left blank, it indicates that the item has been overlooked. All questions should be answered in some manner in order to show that the question has not been overlooked. If "0" expresses the truth, that should be used.

Herewith I enclose a blank and a stamped envelope, and I trust that you will have the kindness to properly fill out the blank, and return it to me at your earliest convenience.

Very respectfully,

HENRY B. BAKER,
Secretary.

In February, 1895, there were printed 500 copies of the following postage bill for use in the office:—

Postage Stamps Used, and Purposes, in 1895.

Received from the Secretary of the* Board, or from the Correspondence Clerk,* postage stamps of denominations, to the number of, value of, and for purposes, as follows:—

Purposes, for Mailing†:—	Postals.	Denomination of Stamps.								Amount.	
		1.	2.	3.	4.	5.	6.	8.	10.	D.	C.
Annual Reports of this Board											
Blanks for Annual Reports of H. O.											
Blanks for Annual Reports of Clerks											
Bulletins, weekly,* monthly,* Health											
Bulletins—Small-pox, etc.											
Card reports											
Card-Reporter's supplies											
Communicable-Disease Pamphlets											
Communicable-Disease Blanks											
Communicable-Disease Letters											
Demand for Return of Health Officer											
Demand for Ann. Report of H. O.											
Demand for Ann. Report of Clerks											
General Purposes											
Inter-State Notifications											
Ordinary Business Letters											
Proceedings of Meetings											
Public-Health Laws											
Reprints											
Request for Final Reports, Dan. Dis.											
Return of Final Reports, Dan. Dis.											
Return Envelopes (State the purpose)											
Sanitary Conventions: Announcements											
" " Programs											
" " Proceedings											
" " Secretary, Con.											
Supplements											
Sets, Small Pamphlets and Diagrams											
Supplies to Meteo. Observers											
Vital Statistics, Volumes											
Total number of stamps, and amount											
Denominations		1.	2.	3.	4.	5.	6.	8.	10.	D.	C.

OFFICE OF THE SECRETARY, STATE BOARD OF HEALTH,

Lansing, Mich., ...189--

Signature:.....

* Erase words so as to express the fact.

† If the envelope or package stamped contains items on several lines, check each line, and enter the postage opposite the one which most nearly agrees with the facts, or with the purpose of sending the package. If the items are large, the distribution general, the proportional amount for each line should be computed and entered in each line.

In April, 1895, 1,000 copies of the above "bill" were printed.

In May, 1895, the pamphlet [120] "Work of Health Officers and Local Boards of Health" was revised in order to bring it up to date, and an edition of 6,000 copies printed for distribution.

In May, 1895, the pamphlet [110] on the "Restriction and Prevention of Scarlet Fever," was revised slightly, and an edition of 20,000 copies printed.

In June, 1895, the leaflet [176] on the "Restriction and Prevention of Measles," was revised and an edition of 10,000 copies ordered printed.

In endeavoring to comply with the new law (Act No. 146, laws of 1895) which required the State Board of Health to place in the hands of each

teacher in the State, information just how each dangerous disease is spread and how each may be restricted and prevented. Considerable work was done on planning a proposed leaflet which should give the "data and statements" required by the law, and a circular asking the coöperation of school commissioners, school boards, and others. The proposed leaflet and the proposed circular were both hektographed and sent to members for their consideration. These leaflets were not printed until July, 1895, and will be found printed in the annual report for 1896.

Complying with the request of the State Board of Health at its meeting, April 12, 1895, the Legislature voted to appoint a special committee to investigate the charges made upon the floor of the House of Representatives against the State Board and its secretary. After considerable delay, the committee finally commenced investigating the work and actions of the Board and its secretary. Many long and tedious sessions of the Committee were held, during which many witnesses for and against were listened to, and some four hundred typewritten pages of testimony was taken. The Committee finished taking testimony about a week before the close of the session; but, because of so much testimony to review, their report was not made to the house until the last two hours of the session. The committee made a majority report favorable to the Board. The resolutions of the Board requesting the investigation, and the report of the committee are to be found further on in this volume under the head "Public Health Legislation and Proposed Legislation."

In June, 1895, 2,000 copies of the above-mentioned report were printed in the form of a two-page leaflet.

INSTRUCTIONS TO NEWLY-APPOINTED HEALTH OFFICERS.

As fast as the names and addresses of health officers to serve in 1895 and 1896 were received, a copy of the pamphlet [120] detailing the duties of health officers, was sent to each, together with blanks "L" for the prompt report of dangerous communicable diseases, and sample copies of pamphlets on the restriction and prevention of diphtheria, scarlet fever, typhoid fever, measles, consumption and small-pox, a pamphlet reprint on the "Restriction and Prevention of Dangerous Communicable Diseases" and a copy of each of two leaflet diagrams, one exhibiting the experience in Michigan in 1890 and 1891, in restricting scarlet fever, the other exhibiting the experience in restricting diphtheria during the years 1889 and 1891. The pamphlet containing the laws relating to the public health which were in force in Michigan in 1890 was so nearly out of print that it was not sent, except in exceptional cases.

HEALTH BULLETINS, WEEKLY AND MONTHLY, AND QUARTERLY REPORTS.

The weekly reports of diseases received up to Wednesday of the week following the week for which they are made, are compiled on that day, week by week, and a bulletin, based on that compilation, is sent for publication to a number of newspapers, and to sanitary and medical journals. A telegraphic abstract from the compilation is also sent to a Michigan Press Association*. A specimen of this weekly health bulletin can be

*This telegraphic abstract of the bulletin was discontinued, in October, 1894.

found on page xii of the Report for 1884, and on page lxxxix of the Report for 1894.

This subject of dissemination of information by means of bulletins is treated of in the article on "Time of Greatest Prevalence of each Disease" in this same volume, pages 81–148.

Beginning with the month of August, 1884, a *monthly* health bulletin has been issued immediately after the close of each month, for the use of members of the State Board of Health and others who are studying the subject. These bulletins are mailed to sanitary and medical journals. Beginning with the bulletin for the month of September, 1889, a third column was added, being the average for the bulletin month in the preceding series of years beginning with the year 1886. This enables the reader to make a comparison of the prevalence of each disease in the last preceding month with the same disease in the corresponding month in the preceding series of years. An example of this form of bulletin is printed on pages xlv-xlvi., of the Report for 1890, and on pages xcii–xciii of the Report for 1894.

At the close of each quarter these monthly bulletins are consolidated for the secretary's "Quarterly Report of Work in the Office," and statement of the "Condition of Health Generally in Michigan," comparing the communicable diseases the quarter just closed with the preceding quarter to learn their increase and decrease; including also the meteorological conditions and the sickness from all causes compared with the preceding quarter, and with the average for corresponding quarters for the series of years beginning with 1886.

Beginning with January, 1890, and ending with February, 1891, a supplementary bulletin was prepared representing graphically the relative amount of sickness from each of the principal diseases in the month for which the bulletin was issued. This was sent with the regular monthly bulletin for the same month. A sample of this graphic bulletin is printed on page xlvii of the Report for 1890, and one is printed on page 85 of the Report for 1891.

DIAGRAMS OF INSTRUCTIVE EXPERIENCE IN MICHIGAN.

Two diagrams, "Isolation and Disinfection Restrict Diphtheria," and "Isolation and Disinfection Restrict Scarlet Fever" have been printed and many hundreds of them distributed as heretofore mentioned. They exhibit in a condensed form, the experience of the health officers in Michigan with these two important diseases; relative to scarlet fever, in 1890 and 1891; and diphtheria, in 1889 and 1891.

The evidence in them is similar to that in similar diagrams which have been published for other years; therefore the evidence gains greatly in strength. They prove that in those localities in which isolation and disinfection are enforced the deaths from scarlet fever and diphtheria are only about one-fifth as many as there are in localities where these measures are not enforced.

ABSTRACTS OF PROCEEDINGS OF MEETINGS OF THE STATE BOARD.

Abstracts and brief accounts, of the proceedings of meetings of the State Board of Health are prepared, hektographed or printed, and distributed as soon as practicable after the meeting. During this year, how-

ever, not so many of these abstracts were printed in pamphlet form. (Minutes of meetings are printed on preceding pages of this Report.) The distribution of these abstracts is not the same for all meetings, they being sent to a different class of persons, according to the nature of the contents, in some instances being sent to sanitary and medical journals, in other instances to teachers, health officers and others.

SECRETARY'S QUARTERLY REPORTS OF WORK IN THE OFFICE.

At the close of each quarter the secretary prepares a brief report of work done in the office. This report is presented and generally read at the next regular or special meeting; and, if the abstract of the proceedings of the meeting is printed, this report is printed in the same pamphlet.

REPRINTS.

Reprints of articles in the Report and in proceedings of Sanitary Conventions, have been made in pamphlet form, and sent in answer to queries in letters, that can best be answered in that manner. For instance, many reprints of the article relative to alleged nuisances in the preceding year have been thus sent out, in response to questions.

A VERY BAD SYSTEM OF HEATING AND VENTILATION AT THE MICHIGAN SCHOOL FOR THE BLIND.

SPECIAL REPORT, BY HENRY B. BAKER, M. D., SECRETARY OF STATE BOARD OF HEALTH.

On invitation of Hon. G. Willis Bement, member of the Board of Control for the Michigan School for the Blind, at Lansing, the secretary of the State Board of Health visited the Michigan School for the Blind with a view of examining the system of heating and ventilation in use at that State Institution. The following letter to a member of that Board of Control will explain what he found.

[Copy.]

MICHIGAN STATE BOARD OF HEALTH,
OFFICE OF THE SECRETARY,
Lansing, June 25, 1894.

Hon. F. S. Wheat, Member of Board of Control, State School for the Blind, Caro, Michigan:

DEAR SIR:—Some time ago, by invitation of, and in company with, Mr. G. Willis Bement, a member of the Board of Control, I visited the State School for the Blind. In going about the main building, I noticed that the present systems of heating and ventilation are far different from what were intended at the time the plans were submitted to the State Board of Health. One of the changes made is so ridiculous that it hardly seems possible that persons of ordinary intelligence could have consented to have it done. I refer to the fact that at the time of my visit I found that, in some parts of the building, the indirect radiators which properly should have been placed in the basement at the bottom of the fresh-air flues, were actually painted black and placed in the several rooms on floors above, in front of the registers which, apparently, were supposed to deliver to the radiators fresh air from below. The ignorance of the first principles of heating and ventilation displayed by such an action is so complete that at first I could hardly believe it possible. But examination of several rooms proved that it was true that such action has been taken. By whom I am unable to learn. The change must have involved considerable expense.

The subject of itself is sufficient to warrant action which shall lead to such changes as will provide proper heating and ventilation. But there are other unsanitary conditions connected with the subjects of heating and ventilation which call loudly for amendment.

In accordance with the recommendation of Mr. Bement, I write this letter to you—the chairman of the Committee on Sanitation in your Board of Control, in order to urge that there may be made by some person competent to advise on the subject, a thorough examination of the building, with a view of ascertaining just what should be done to put it in good sanitary condition as a building in which the wards of State are kept.

I understand that it will probably be necessary to apply to the legislature for an appropriation to meet the expense of making the necessary changes. I can assure you that it is important that changes be made, and that they be made as soon as possible.

Very respectfully,

HENRY B. BAKER,
Secretary.

In reply to the above letter, the following letter was received:

FREDERICK S. WHEAT,
Counsellor at Law, Caro, Mich.

July 3, 1894.

HENRY B. BAKER, M. D., *Secretary State Board of Health:*

DEAR SIR:—Your letter of June 25, relating to the system of heating and ventilation of the Michigan School for Blind lies before me and is both timely and suggestive.

The system, or rather lack of system had been considered by this Board of Control and condemned some time ago. That you wonder at the change made is not a matter of surprise and with a view of fixing the responsibility I enclose herewith part of Fifth Biennial Report and letter from "an expert on the subject of heating" which may explain the radical changes from plan first adopted.

Unfortunately the present board has no sum available to make the change needed to carry out your suggestion and until the Legislature will make such grant we can only hope that residents at school may not be permanently injured.

Yours, etc.,

F. S. WHEAT,
Secretary.

To explain how such a system of heating and ventilation came to be placed in the School for the Blind, the following paragraph is quoted from page 22 of the Fifth Biennial Report of the Board of Control of the Michigan School for the Blind for the fiscal period ending June 30, 1890:—

"The large amount of fuel heretofore consumed has caused the board much anxiety, and to find a remedy we engaged the services of Prof. R. C. Carpenter, of the Michigan Agricultural College, an expert on the subject of heating. His very able report is herewith submitted. Acting upon his report and suggestions we have made important changes in our system of heating, which we trust will result hereafter in large saving in the consumption of fuel."

The following is a copy of the report made by Prof. Carpenter to the Board of Control for the School for the Blind:

To the Board of Control, State School for the Blind:

GENTLEMEN:—In accordance with your request, I made an examination of the system of heating in use in the State School for the Blind, and prepared plans and drawings to modify it so as to be more economical so far as the use of steam is concerned.

The system in use is that known to steam fitters as the "indirect system of heating." The method is to place a steam radiator at the bottom of a flue leading to a given room. In this way the room is supplied with a current of heated air, and good ventilation is secured.

The more common way is to place a radiator in the room to be heated, and thus secure the advantage of radiated heat, instead of conducted heat. This method requires only about 40 per cent the amount of coal required by the other method, in order to secure the same degree of heat, but the ventilation thus secured is not nearly so good. The first method introduces very many times as much air as is needed for

ventilation to keep the room warm. The second method depends upon accidental circumstances to secure ventilation.

On looking over your buildings, I found that the system of construction used would admit of the use of the new system of heating, which combines all the advantages of the first system, with very many of the second. That is, we can positively introduce into each room a large body of fresh air, partially heated, while at the same time the occupant of the room will be warmed by radiated heat. We thus will give him the advantage of pure air and radiated heat. That is, he will receive heat by both conduction and radiation. There are very many people who believe that radiated heat is necessary to the fuller development of the body. No one questions the necessity of pure air.

This change is brought about by reversing the air currents in the chimneys supplying the building, and this can be done in a positive manner by cutting off the flues, as explained in my specifications to your engineer.

Each room is already supplied with an exhaust flue for foul air, which leave as it is. The large flues, leading to the various halls are to be connected to the pure air outside, and the tops of these flues stopped to prevent the escape of this warm air above the building. This warmed air will then be discharged at frequent intervals into the halls and corridors.

Each sleeping room is now provided with a grated opening leading into the halls, which cannot be closed. Through this opening the pure and partially warmed air from the halls will pass into the various rooms to be further warmed by the direct radiator, and, finally loaded with impurities, will pass outward through the heated foul air shafts. This system should introduce large bodies of pure air into each room without a sensible draft, and be unaffected by the cold winds which influence to a great degree the working of the indirect system of the old kind.

It ought to produce more economical results, first, because the occupants get the benefits of both radiated and conducted heat; second, because cold winds will not blow in directly over the radiators and chill the air shaft and the occupants of the room; and third, all the heating surface in unoccupied rooms can be cut off from steam circulation by simply closing the valves.

It will give good ventilation because it provides for the introduction into the center of the building of large bodies of pure air (warm), which pass into the various rooms, are farther heated, and then pass off in foul air ducts, which are heated. The saving in coal should be, for the reasons stated, a large per cent of the amount previously used.

The specifications of this work, provided for certain minor changes in the drips and positions of certain radiators to improve their efficiency. 3d.—For the construction of radiators out of the indirect heaters, by setting them on legs and enclosing them with a neat screen—the object of the screen being to prevent the children from running against them, and to improve their appearance.

2d.—For the substitution in most of the rooms, direct radiators for the present indirect heaters.

4th.—Leave the rooms of the superintendent, the hospital in the north end (these rooms being in the same vertical plane), as they are at present, for the reason that the saving of fuel in these particular rooms will not compensate for the expense of the change.

5th.—Arrange the flues now taking the foul fair from the halls to deliver pure air into the halls, by connecting them at the bottom with the pure outside air, and closing the tops so that no air will escape above the roof—the heaters in these flues are sufficient to warm the air and insure a circulation.

6th.—See that all foul air ducts leading from each room are in good condition and kept warm by a radiator in the bottom. Each flue should be 6x6 inches.

Respectfully submitted,

R. C. CARPENTER.

To Mr. Wheat's communication, the following reply was written by the Secretary of the State Board of Health:—

(Copy.)

STATE BOARD OF HEALTH, MICHIGAN,
OFFICE OF THE SECRETARY,
Lansing, July 5, 1894.

Hon. F. S. Wheat, Secretary Board of Control, School for the Blind, Caro, Michigan:

DEAR SIR:—Please accept cordial thanks for your letter of July 3, and for the extract from the Fifth Biennial Report of the Board of Control for the State School for the Blind, all relative to the system of heating and ventilation at the State School for the Blind.

There seems to have been in 1890 a plain violation of the State law by the Board of Control. The State law requires that all plans for heating and ventilation of State Institutions, should be submitted to this

Board for examination. If the plans as then adopted and carried out had been submitted, this Board would have certainly disapproved them. Very respectfully,

HENRY B. BAKER,
Secretary.

The foregoing correspondence, is in itself explanatory and shows the need of an obedience of State law. This subject was presented to the State Board of Health at its meeting July 12, 1894, but no formal action was taken.

REPORT ON BEST METHOD OF DISPOSAL OF EXCRETA AND WASTE WATERS AT HARBOR POINT, MICHIGAN.

BY HENRY B. BAKER, M. D., LANSING, MICH., SECRETARY OF THE STATE BOARD OF HEALTH.

To the Board of Trustees of the Harbor Point Association:

GENTLEMEN:—In accordance with an invitation to me by a vote of your association August 27, 1894, communicated to me by your Secretary, Mr. J. Edward Earle, I have visited Harbor Point, conferred with your Board and with members of the association, investigated the conditions bearing upon the subject of the best disposal of excreta and waste waters, and I now respectfully submit this report.

My visit was near the close of the season, when any unsanitary conditions might have been expected to have culminated. But I found this pleasant summer resort in good sanitary condition. However, it is now possible to have certain refinements in the modes of disposal of excreta, waste water, etc., which add greatly to the comfort and pleasure of inhabitants of thickly-settled localities. I was agreeably surprised to find at Harbor Point, the plumbing so generally done in accordance with correct principles. And so far as individual effort was concerned, the best possible disposition of excreta and waste has, in many instances, been adopted. But by proper coöperation, which can best be done through action by your Board of Trustees, it will be possible to do much better than has been possible through action by individuals alone. Under individual effort nearly every cottage might have its house-drainage go out into the harbor or bay; but that would to some extent contaminate the entire water front, so that the pleasure of bathing of children and others, and the beauties of the waters and shores would be greatly diminished. The dry-earth system, with daily removal, is a great improvement over the horrible old-time privy vault. But it is impossible to always completely cleanse the dry-earth receptacle; and it is possible, not only for slight unpleasant odors to be observed, but for germs of disease to be floated off from such receptacle. Therefore, where cottages are so close to each other as on Harbor Point, that is not the best method.

The modified cesspool, with sub-surface disposal of the sewage, which has been adopted by a few, may perhaps be safely and pleasantly used in some parts of the Point, comparatively remote from cottages. But I do not recommend that system for general use, nor anywhere where the water-carriage system entire can be used. For a summer resort to which

people go for health and pleasure, wherever it is practicable to avoid it, I do not think highly of any system of storage of excreta. And, although engineers find it economical to their employers to put in catch basins to intercept rags, articles of clothing, and other substances which find their way into water-closets, and which if not intercepted by a catch basin, tend to clog up sewers and thus cause expense and trouble, yet I would have as few of these as possible, and as far as possible from residences and from places liable to be visited by children.

The most satisfactory disposal of excreta known at present is by the water-carriage system, wherever that is available. Where that system is used, the aim should be to cause the quickest possible removal of all sewage to the greatest practicable distance, in order to avoid decomposition and consequent formation of unpleasant gases; to prevent the backward flow into houses of any gas which may be formed, and especially to prevent the entrance of any "germs" of disease which may be associated with sewage, and which may be detached by currents of air from places on which the infected sewage has dried. These requirements are best fulfilled by sewers, as smooth inside as is practicable, well laid, straight, or at least without right angles, and as small as will carry the quantities of fluids to be carried.

I strongly recommend that your Board of Trustees take such action as shall result in the construction, maintenance, and enforced use of such a sewer, which shall commence, on both shores of the point, as far towards or on the main land as shall be found practicable by a competent engineer, and which shall have its outlet in deep water beyond the extreme point of Harbor Point, passing, as it must, one side or the other of the United States Light-House grounds. If the engineer finds no serious objection, I would slightly prefer, for a sanitary reason, that it go on the Bay side of those grounds, because probably there would then be slightly less liability of sewage matter being washed ashore during winds inshore. But from what I can learn of the prevailing winds and currents, it does not seem likely that there will be much trouble from this cause whichever side of the extreme point the sewer outlet is placed. But even if there shall be under unusual conditions slight trouble of that kind, that will be better than under the present conditions when sewer pipes go out, from the club house into the Bay, and from several cottages into the harbor, thus multiplying the chances of matter from them being washed ashore. Delivering all the sewage possible as far out from the point as practicable will result in purifying both shores; and with good plumbing throughout, and with such an excellent water-supply as now exists, will make Harbor Point an ideal place, from a sanitary standpoint, it always has been a remarkable place because of its great natural beauty, water breezes, and delightfully good atmosphere.

On the harbor side of the point near Harbor Springs, are a few cottages from which, because of their low situation, and because of a higher ridge between them and the point, it seems probable the sewage cannot well be taken out to the extreme point. To these I would recommend the application of the same principle, namely good plumbing, the grouping of house drains from all into one sewer, placed as far towards the point as is practicable, and which shall go out into deep water. Then the off-shore winds, and an under current which I believe exists, will be most likely to carry the sewage out beyond the dock and where it will be so dilute as to do no harm.

I understand that no considerable number of persons design to use the water of the harbor or bay for drinking purposes. Nevertheless I was informed by an employé on one of the steamboats which ply between the several resorts, that the ice water on that boat for the use of passengers, and of which I had just drank, came from the bay. I respectfully suggest that you take such action as will prevent if possible the continuance of such a practice; because, however free from causes of typhoid fever or diarrheal diseases the conditions may be at Harbor Point, its residents or guests might sometime contract such diseases by drinking water which came out of the harbor or bay, surrounded and covered as these waters are in summer by a dense population whose sewage naturally goes into these waters. The bay water is so remarkably pure that a small quantity of sewage would not make it sufficiently impure in appearance to be noticed, yet it might then convey disease.

I recommend that your sewer system (or systems, in case it is found, as I fear, that not all parts of the Point can be sewered to one outflow at the extreme point) shall be planned and constructed under the supervision of a competent and experienced engineer, who will be certain that the gradients are right, that the materials of the conduits are suitable, of proper sizes, of good quality, and well placed; and that proper provision is made for flushing the sewers in summer by some such method as by the use of Field's automatic flushing tank, and for completely emptying the sewers in winter, for the care of the outfall end of the pipe in winter, having in mind freezing and the action of ice and of storms; also in summer, having in mind vessels and their anchors. I recommend to you, as such engineer, George S. Pierson, C. E. of Kalamazoo, Michigan.

With best wishes for your increased comfort and pleasure in your beautiful summer home,

Very respectfully,

HENRY B. BAKER.

Lansing, Michigan, September 18, 1894.

OBITUARY NOTICE OF DR. H. F. LYSTER, OF DETROIT, MICH.

This well known Detroit physician died suddenly on a Michigan Central train while on his way to Santa Fé, Oct. 11th. For several years his health had been gradually failing. Many times he has visited other climates in the pursuit of health. The climate of Santa Fé seemed to benefit him most.

Born in Ireland, of highly educated parents—his father being an Episcopalian minister—he took up his residence in Detroit forty-eight years ago, an infant. Educated in Michigan schools; having a long and honorable record as a surgeon; serving as professor of surgery in the Medical Department of Michigan University; one of the editors of the *Peninsular Medical Journal*; one of the founders of the Michigan College of Medicine and Surgery, one of its presidents, and always one of its teachers; one of the faculty of the Detroit College of Medicine after its consolidation with the Michigan College of Medicine; for a long time an efficient member of the State Board of Health, always a member of the Detroit Medical societies, the Michigan State Medical Society, and the American Medical Assoc., yet never failing in his duties to a large and

influential clientele, or as a citizen in the community in which he lived; he formed a personality which has done much to promote the development of the medical profession of Michigan and the best interests of the entire commonwealth.

He leaves a family of five children, one a practicing physician, one a student in Michigan University, one in the Detroit High School, and two young ladies.

His wit and humor delighted many a social festive board, and his genial personality won for him hosts of friends.

He was a scholarly medical gentleman, one who will be sadly missed in numerous circles outside his immediate family.*

At the meeting of the State Board of Health, at Lansing, resolutions drafted by Prof. Fall, were unamiously adopted as follows:—

WHEREAS, The members of the State Board of Health have heard with deep regret, that "The silent reaper whom men call Death" has removed from the scene of his life's activities one who was for many years a highly esteemed and useful member of this Board, therefore,

Resolved, That in the death of

HENRY F. LYSTER, M. D.,

the more immediate and intimate circle in which he moved, the City of his residence, and the State have suffered a loss which is severe indeed. His influence was far reaching and powerful and always for the good of those on whom that influence rested.

Resolved, That the members of this Board, his associates for so many years, desire to place on record their high appreciation of his great work to the cause of sanitary reform. To this cause he gave freely of his wealth of time and talents. He was peculiarly fitted to further the work of education of the people on the lines of sanitary science. He was cultured and versatile, an entertaining lecturer, an extensive traveler and wide observer of men and affairs, and all these he contributed to his work for the good of others.

Resolved, That we tender the bereaved family our most heartfelt sympathy.

Resolved, That these resolutions be spread on the minutes of the Board, and that a copy be sent to the friends of the deceased.

THE STATE QUARANTINE LAW.—THE LAW IS CONSTITUTIONAL, BUT NOT VERY USEFUL.†

SPECIAL REPORT BY HENRY B. BAKER, M. D., SECRETARY OF STATE BOARD OF HEALTH, LANSING, MICHIGAN.

"During the quarter, the State Supreme Court has decided the question of the constitutionality of the law which authorizes the State Board of Health, under certain circumstances 'to establish a system of quarantine for the State of Michigan or for any portion thereof.'

"The court decides that the law is constitutional.

Rule 2 of this Board, under the State Quarantine Law, is not valid.

"The 'circumstances,' specified in the law, as warranting the State Board of Health in establishing a system of quarantine, are such as generally prevail in *every* country, it being within the knowledge of this Board through its system of exchanges of weekly, monthly and other

*American Lancet, Nov., 1894, p. 424.
†Special report made to the Michigan State Board of Health at its regular meeting, Oct. 12, 1894.

ports, etc., throughout the world, that such 'dangerous communicable seases' specified in the law, are now and are generally present in *every* untry. This was true at the time this Board made and published the ules' under this State quarantine law. It was also true relative to olera, which, although not the most dangerous disease to citizens of ichigan, is yet one of such 'dangerous communicable diseases' conmplated by the law; cholera was then liable to be brought to this untry by any immigrant from any country, because of the diffusion of olera in so many centers of distribution of immigrants. But in this claration of the 'circumstances' upon which this Board based its ules' made under the law, these facts were not advertised. Without aking plain the fact that there was then danger of the introduction of 'dangerous communicable disease' from every country, the 'Rule 2' quired the disinfection of all baggage of all immigrants. The Supreme ourt has decided that 'Rule 2,' as made and published, was not author-ed by the law.

"I hope it will be possible to frame a rule which shall be authorized by w, and which shall fill the requirements for protection of the people of lichigan from the introduction of dangerous disease.

"Perhaps it may be sufficient to declare that such diseases are present 1 every known country. But this may not be sufficient; and the fram-ng of a rule may not be as easy as at first sight it appears.

Is the State Quarantine Law Sufficient?

"When immigration increases again, danger of the introduction of isease may and probably will attend all bagagge of all immigrants. Inless the law is amended, it may be necessary to specify, by name, very known country, and not only that but the names of the particular angerous diseases present in each such country. Probably this may be one; but in an emergency it might delay proper action by this Board.

"The theory of the law seems to me to be wrong. It seems to assume iat if there is no dangerous communicable disease in a given country it entirely safe to permit immigrants from that country to enter Michigan ithout any precaution whatever. This theory is probably held to be ue by most people, including courts and juries, but it entirely disregards nportant facts relative to the modes of spreading dangerous communi-able diseases:—

"1. An immigrant may come from a place free from infection of any angerous disease, and his baggage may become infected on shipboard r at some center of embarkation or debarkation where immigrants from iany countries congregate. He may himself be immune against a given isease, and thus himself be free from any evidence of infection; yet his aggage when opened in the home of some inhabitant of Michigan may pread a dangerous disease.

"2. An immigrant may really come from a place which is infected ith a dangerous disease, yet his place of embarkation may be in a ountry, or at least in a city in which the particular disease with which is baggage is infected may not be present. If he is considered as from he country in which he embarked, he will be considered as free from he infection which in reality his baggage contains.

"There are other facts bearing upon the subject, which are well known to members of this Board, but those I have mentioned seem to be sufficient to indicate the imperfection in the theory of the State Quarantine Law."

The decision of the Supreme Court is as follows:—

JOHN HURST, vs. FRANK R. WARNER, } Filed Sept. 27, 1894.

MONTGOMERY, J.

The plaintiff, who is prosecuting attorney for the county of Chippewa, on the twenty-fourth of November, 1893, presented to the respondent, who is a justice of the peace of said county, a complaint alleging that one Robert B. Finch was a station agent of the Minneapolis, St. Paul & Sault Ste. Marie R. R. Co. at Sault Ste. Marie, and on the twenty-third of November, 1893, in charge of a train belonging to said railway company; that on said train there was baggage consisting of clothing, wearing apparel, etc., belonging to one Edmund Watelet, an emigrant, late of Havre, France, who was traveling through Michigan to Minneapolis and whose baggage was liable to be disinfected by one Thomas N. Rogers, an inspector, authorized by the Michigan State Board of Health, of all immigrants destined to pass into or through the State of Michigan; that said Finch was requested by said Rogers to detain said baggage for disinfection and inspection and wilfully refused so to do and proceeded with said train and said baggage in and through Michigan, in violation of rule number two, framed and published by the Michigan State Board of Health, under act number 230 of the laws of 1885, as amended by act number 47 of the laws of 1893 of this State. Upon the presentation of this complaint the respondent was requested by the relator to cause a warrant to be issued, based upon said complaint, but declined to do so for the reason that act number 47 of the laws of 1893 was unconstitutional and void, and for the further reason that if said act was not void, rule number two, upon which the prosecution was based, was not authorized by said act, and that the Board of Health exceeded its authority in passing said rule. The relator then applied to the circuit judge for a *mandamus*, which was refused, and *certiorari* has been issued to review his decision. The two questions presented here are those which determined the action of the justice.

I. It is contended, and the circuit judge held, that the statute in question is unconstitutional for the reason that it delegates to the Board of Health legislative power in contravention of section one of article four of the Constitution, which provides that "legislative power is vested in a senate and a house of representatives." To determine the question involved it is necessary to refer at some length to the provisions of the statute.

Section one provides that "whenever it shall be shown to the satisfaction of the State Board of Health that cholera, diphtheria, or other dangerous, communicable disease exists in any foreign country, neighboring state, or locality within this State whereby the public health is imperiled, and it shall be further shown that immigrants, passengers, or other persons seeking to enter this State, or to travel from place to place within this State, are coming from any locality where such dangerous, communicable disease exists, and are likely to carry infection of such dangerous, communicable disease, the State Board of Health shall be authorized to establish a system of quarantine for the State of Michigan or for any portion thereof."

Section two provides that "such quarantine shall be for the purpose of preventing all immigrants, passengers or other persons, under the circumstances mentioned in section one of this act, from entering the State or from going from place to place within the State, who in the opinion of the State Board of Health, or in the opinion of an inspector duly appointed by said Board, are likely to carry infection of cholera, small-pox, diphtheria, or other dangerous, communicable disease; and for the detention of all such persons outside the borders of the State, or if already within the State, at the places where they may be or at the place they have been exposed to or have contracted such dangerous, communicable disease or at such suitable place as such board may provide, during the period of the incubation of such disease, or of its existence if already developed, and until in the opinion of the State Board of Health such persons are free from all danger of infection."

Section three provides that "the State Board of Health is authorized to establish general rules, and, by an inspector acting by virtue thereof, to detain railroad cars or other public or private conveyances whenever it shall be shown to the satisfaction of such Board, or to the inspector as provided in such rules, that such cars or other conveyances contain any passenger, person or property which has been exposed to cholera, diphtheria, or other dangerous, communicable disease, or when it shall be shown to the satisfaction of such board or inspector as aforesaid, any passenger, person or property are being transported on such railroad cars or other public or private conveyance from any locality within or with-

out this State where any such dangerous, communicable disease exists and where under the circumstances shown to such board, such persons or property are likely to carry infection of such dangerous, communicable disease. In such case said board may, by its duly constituted inspectors, remove, isolate, place under the care of the local boards of health, order to be returned to the places whence they came, or dispose of in any other manner it may consider proper, all railroad cars or other conveyances, all passengers in such railroad cars or other conveyances, where there is reason, as aforesaid, to believe such may have contracted or become infected with any dangerous, communicable disease, or have been exposed or infected by any such disease in a manner likely to render them bearers of infection. * * * * * * "

Section four provides, "All such persons, their baggage and other personal effects, and all such conveyances shall be disinfected under such rules and regulations as the State Board of Health may establish for the purpose or carrying into effect the provisions of this act, before such persons or baggage or conveyances shall be permitted to enter the State, or to proceed to their or its destination if already in the State."

Section five provides for the disinfection of goods, merchandise, conveyance or other property which the State Board have reason to believe may carry the germs of cholera or other dangerous communicable disease, and under the circumstances mentioned in sections two and three of the act, to prohibit the entry of such goods, merchandise or other property into the State, or their being moved if within the State, until such disinfection shall be accomplished.

Section six provides, "It shall be the duty of the State Board of Health to frame and publish rules for the inspection, isolation, detention and disinfection contemplated in this act;" and further provides as follows: "Whoever shall wilfully violate the rules of the State Board of Health made in pursuance of this act, or the order, by its duly appointed inspector, made in obedience to such rules, shall be deemed guilty of a misdemeanor, and on conviction thereof shall be liable to payment of a fine of one hundred dollars and costs of prosecution, or imprisonment in the county jail for a period not to exceed ninety days," etc.

As was said by Chief Justice Marshal in Wayman v. Soythard, 10 Wheaton, 1. "It will not be contended that Congress can delegate to the courts or to any other tribunals, powers which are strictly and exclusively legislative. But Congress may certainly delegate to others powers which the legislature may rightfully exercise itself. * * * The difference between the departments undoubtedly is that the legislature makes, the executive executes and the judiciary construes the law. But the maker of the law may commit something to the discretion of the other departments, and the precise boundary of this power is a subject of delicate and difficult inquiry."

In In Re Griner, 16 Wis., 457, Justice Cole, speaking for the court and referring to the rule that the powers of the different departments are not to be confounded or delegated by the one department to the other, said, "Most of the propositions stated are recognized political maxims under our form of government. It is only the conclusion or deduction from those propositions about which any doubt can exist. No one will seriously contend that congress can delegate legislative power to the president. But a distinction must be made of 'those important subjects which must be entirely regulated by the legislature itself from those of less interest in which a general provision may be made and power given to those who are to act under such general provisions to fill up the detail.' It would seem that the power given to the president to make all rules and regulations to carry into effect the law for calling out the militia, is of the latter character. Congress might have regulated by legislation the whole details of the draft, if it had thought proper to do so. But having in the most ample manner clothed the president with power to call forth the militia, it further provided that he should make all proper rules and regulations for the enforcement of the draft where State laws upon the subject were defective. * * * * * * * This no more partakes of legislative power than that discretionary authority entrusted to every department of the government in a variety of cases. The practice of giving discretionary power to other departments or agencies who were intrusted with the duty of carrying into effect some general provisions of the law, had its origin at the adoption of the Constitution and in the action of the first congress under it, as the federal legislation abundantly shows."

See also as bearing upon this question, Field v. Clark, 12 S. C. R., 495; Locke's Case, 12 Pa. St., 491; Georgia R. R. v. Smith, 9 A. R. R. Cases, 355.

In the present case we think it can hardly be doubted under the authorities cited that the legislature might have provided for the disinfection of the baggage and personal effects of travelers coming from infected ports, under the direction of an inspector of the board. To have made such a law effective it would have been essential that the inspector should have been given authority to act and to have made it a misdemeanor to refuse to recognize his authority. The present act does nothing more except that it

provides that such disinfection shall take place under general rules to be adopted by the State Board Health. The rules relate to matter of detail. It is well known that there are different methods of disi fection. It was properly left to the board by the legislature to determine as to these methods, and inste of intrusting it to the discretion of the individual inspector it was prescribed that general rules shou be adopted. We are referred to the case of the Senate of the Happy Home Club v. The Board of Sup visors, 57 N. W. R., 1101, recently decided by this court, as authority for respondent's contention. T statute considered in that case bears no analogy to the statute under consideration. The power was the delegated to a private corporation to make rules governing the conduct of the accused, the observance which rule should operate to acquit and discharge the accused. This did not leave a discretion in publ officials as to the mere details of the operation of the law, but was an attempt to delegate power to private corporation, which it was clearly beyond the authority of the legislature to do. Reliance seer to have been placed by the circuit judge upon two cases of Ex Parte Cox, 33 Cal., 21, and Harbor Comm sioners v. Redwood Co., 88 Cal., 491. In the latter case an attempt was made to confer upon the board harbor commissioners the power to prescribe rules and fix the penalty for their violation, which clear distinguishes it from the present. In the case of Ex Parte Cox, the petitioner was convicted of a misd meanor consisting of a violation of a rule and regulation of the board of State Viticultural Commi sioners. The act of the legislature in question declared that the board should have power to declare an enforce rules and regulations in the nature of quarantine to govern the manner of and restrict and pr hibit the importation into the State of infected articles and empty fruit boxes, and declared that a wilf violation of the quarantine regulations of the board should be a misdemeanor. The court say, "The ac before us does not say it shall be unlawful to import, distribute or dispose of infected articles, but purports to confer upon the board the power to so declare." We think our statute is distinguishable principle from the one here dealt with. The effect of the provisions of our statute is to declare it unla ful for any person to refuse to permit his baggage and personal effects to be disinfected in accordan with the rules and regulations of the Board of Health. The rules and regulations are limited to the pu poses which are specifically described by the act. We think the statute is constitutional.

II. As above stated, by the above act of 1893 it was not intended to confer upon the Board any pow beyond that of fixing the method to be adopted in carrying into effect the details of the isolatio inspection, disinfection, etc., provided for by the law itself. By the first section the Board was autho ized to establish a quarantine when it is shown to the satisfaction of the Board that dangerous, con municable disease exists in any foreign country, neighboring state or locality within this State and wh it shall be further shown that immigrants, passengers, or other persons seeking to enter this State or travel from place to place within this State are coming from any locality where such dangerous, con municable disease exists. By section three it is provided that "the State Board of Health is authoriz to establish general rules, and, by an inspector acting by virtue thereof, to detain railroad cars or oth public or private conveyances whenever it shall be shown to the satisfaction of such board or to t inspector as provided in such rules, that such cars or other conveyances contain any passenger, pers or property which has been exposed to cholera, diphtheria, or other dangerous, communicable disease, when it shall be shown to the satisfaction of such board or inspector as aforesaid, that any passenge person or property are being transported on such railroad cars or other public or private conveyan from any locality within or without this State where any such dangerous, communicable disease exis and where under the circumstances shown to such board, such persons or property are likely to car infection of such dangerous, communicable disease." A careful examination of the rules declared by t board, and particularly of the one alleged to have been violated, leads us to the conclusion that the boa exceeds the authority conferred by the statute by the promulgation of the rule in question. The rul recite the existence of communicable diseases in various foreign countries from which immigrants a coming to the United States in large numbers, and then proceeds by rule two, "Except as hereinaft specifically excepted, *all* baggage of *all* immigrants and all containers of all such baggage destined to pa into or through Michigan must be detained until disinfected." The exceptions mentioned are, firs "baggage bearing a certificate issued by an inspector authorized or accredited by the Michigan Sta Board of Health;" second, baggage contained in sealed cars, such seals not to be broken or the ca opened in the State of Michigan; third, "hand baggage of immigrants used en route, and known to hav crossed the ocean in ships uninfected with any dangerous, communicable disease, or bearing a certificat of disinfection, issued by an inspector authorized or accredited by the Michigan State Board of Health. Under these rules the baggage of all immigrants was subject to disinfection whether such immigra came from a port or locality where any dangerous, communicable disease existed or not. Indeed, the was no allegation in the complaint that the baggage in question came from such locality. This beyond the power of the board. We do not intimate that it would not be competent for the legislatu to provide for the disinfection of all baggage, where, in the opinion of the Board of Health, from t

prevalence of a contagious disease, such precaution is necessary. But, instead of doing so, it is provided by section three that the board is authorized to establish general rules and by an inspector acting by virtue thereof to detain railroad cars or other public or private conveyances, etc., whenever it shall be shown to the satisfaction of such board or to the inspector as provided in such rules, that such cars or other conveyances contain any passenger, person or property which has been exposed, etc., or when it is shown to the satisfaction of such board or inspector as aforesaid that such passenger, person or property are being transferred from any locality where any such dangerous, communicable disease exists and where such persons or property are likely to carry infection of such dangerous, communicable disease. The rule in question did not make it a pre-requisite to the inspection that the baggage being transported come from a locality where such disease existed, as ascertained either by the board or inspector, and in this respect was broader than the statute and cannot be sustained.

It follows that the justice was right in refusing to issue the warrant. We have, however, gone at length into the consideration of the provisions of the statute to show to what extent authority is conferred upon the board, as the question involved is one of great public importance.

The judgment will be affirmed.

The other Justices concurred.

IN THE SUPREME COURT.

STATE OF MICHIGAN,—ss.

CLERK'S OFFICE.

I, Charles C. Hopkins, Clerk of the Supreme Court of the State of Michigan, do hereby certify that the annexed and foregoing is a true and correct copy of the opinion of the Court now on file in said court in said cause; that I have compared the same with the original, and that it is a true transcript therefrom, and the whole of said original.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seal of said Supreme Court, at Lansing, this first day of October A. D. 1894.

[L. S.]

CHAS. C. HOPKINS, *Clerk.*

By JOS. H. DUNNEBACKE, *Deputy Clerk.*

INTERNATIONAL CONGRESS OF HYGIENE AND DEMOGRAPHY AT BUDA-PESTH, HUNGARY, EUROPE, SEPT. 1-9, 1894.

REPORT OF THE DELEGATES APPOINTED TO REPRESENT THE MICHIGAN STATE BOARD OF HEALTH.

To the Members of the Michigan State Board of Health:

GENTLEMEN:—Your delegates, appointed to attend the International Congress of Hygiene and Demography at Buda-Pesth, beg leave to make the following report:

In point of attendance and in the entertainment of delegates, the Congress was a complete success. The proverbial hospitality of the Hunagrians was exemplified to the fullest extent and will long be remembered by those who were fortunate enough to visit at this time their picturesque and beautiful capital. However, as your delegates, we were more deeply interested in the scientific work of the Congress than in the social entertainments which accompanied the same. There were some notable papers read at this Convention, and we desire to give a brief statement concerning some of the most important of these.

The contribution made by Professor Metchnikoff on Cholera was of the greatest importance. Professor Gruber opened the discussion on this

subject. He claimed that while we may regard the comma bacillus of Koch as a factor in the causation of Asiatic cholera, we must admit that the discovery of this germ has not fully explained the etiology of the disease. Then Professor Metchnikoff detailed his experiments, in which he has demonstrated that the comma bacillus in mixed cultures with certain other germs is capable of inducing Asiatic cholera in typical form in some of the lower animals. In other words, he has shown that cholera is due to a mixed infection. Pettenkofer has for some years claimed that there are at least three factors in the causation of cholera. These he has designated as x, y and z. x is the germ, y, the condition of the locality, and z, the susceptibility of the individual. Now Metchnikoff explains what there is in the condition of the locality which causes Asiatic cholera. The germ may be present and the individual be susceptible, still an epidemic will not prevail unless the condition of the locality is favorable. This favorable condition of the locality depends upon the presence of the other germs, notably upon the presence of certain sarcinae, torulae and bacilli. He shows that although the water supply of Versailles was contaminated with the cholera germ in 1892, no epidemic prevailed at that place, and he explains this by the absence from the water of the other germs, the aid of which is necessary to induce the disease. In Hamburg, on the other hand, all the conditions were favorable. The cholera germ was introduced into the water of the Elbe, which was already contaminated with the other organisms, and the drinking of this mixed culture induced the disease in those susceptible.

The importance of this contribution of Metchnikoff will be understood when we bear in mind that under the teaching of Koch and his disciples many have come to the conclusion that the contamination of drinking water with non-specific micro-organisms carries with it no danger. Metchnikoff shows that pollution with the comma bacillus, when the other germs are not present, does not induce the disease. This will lead us to again give more attention to cleanliness, and cholera, which we had ceased to regard as a filth disease, is now shown to be dependent upon contamination to the extent mentioned.

It should be stated that while the presence of certain micro-organisms increase the virulence of the comma bacillus, others diminish it.

Doctor Yersin of Paris, who has been studying the pest in Hongkong, China, exhibited photographs of the bacillus which causes this disease. These photographs were made from the blood of persons sick with the disease, from pure cultures, and from animals which had been inoculated with these pure cultures. It was announced in the daily papers, about the time of the Buda-Pesth meeting, that this bacillus had been discovered by the Japanese bacteriologist, Kitasato. It seems, therefore, that Yersin and Kitasato, working independently, have discovered the same organism. This renders it all the more probable that they have found the true cause of the disease.

Professor Roux of Paris read a very valuable paper on the blood serum treatment of diphtheria. Since his paper has already appeared in full in the September number of the Annales of the Pasteur Institute, it will not be necessary to go into detail concerning it. In a general way it may be stated that while the mortality among cases in the hopsitals of Paris, treated by other methods, amounted to about as much as fifty per cent, that among those treated with blood-serum fell to about twenty-five per cent. Roux obtains his blood-serum from horses which have been made

immune to the disease by repeated inoculations with filtered cultures of the diphtheria germ. These animals furnish a large amount of serum, and by continuing the inoculations from time to time, the immunity is kept intact.

A paper by Behring upon the same subject was read. This investigator obtains serum from goats, which have been rendered immune, by inoculation, to the diphtheria bacillus. Blood-serum therapy will undoubtedly soon have extensive trial, and if it does no more than reduce the mortality half, great good will be accomplished. Roux thinks that even better results may be expected by acquiring more skill in the preparation of the agent and the treatment of the patient. It should be remarked that this treatment is of but little service unless begun early in the course of the disease.

There were reports from various countries concerning the sanitary management and control of diphtheria. It was a matter of national pride that our own countrymen, especially the health authorities of New York City, are doing better, and more scientific work, in this direction than those in any other part of the world. Professor Welch prepared and Dr. Billings presented a summary of the scientific work which has been done upon diphtheria in this country, and the showing is certainly a credit to the nation.

Professor Leyden of Berlin gave a lecture on the care of tuberculous patients, which is of special interest to this Board at this time. He stated that in Germany there are at present not less than 1,300,000 persons afflicted with tuberculosis. Of this number, 170,000 to 180,000 die yearly. He claims that it is the duty of the State to isolate, take care of, and treat the consumptive poor. A few cities in Germany have already built consumption hospitals. The first to do this was the city of Frankfort. The cost of maintaining this hospital is about 62½ cents for each patient per day. Professor Leyden claims that a fair per cent of these can be cured, and that the treatment can be carried on quite as successfully in low as in high altitudes. He thinks that the consumptives thus brought together should be divided into two classes, the curable and the incurable, and that these should be kept in separate buildings or separate wards. He thinks that in this way not only can many cures be brought about, but the spread of the disease will be greatly retarded.

Interesting papers upon water supply, filtration, etc., were read in the section devoted to this subject. One of your delegates read two papers, one upon immunity secured with nuclein, and the other upon a method of the bacteriological study of drinking water. The other delegate also presented two papers, in one of which he described a new germ of malignant œdema discovered by himself, and in the other, methods for the anærobic culture of germs. With a Congress divided into more than twenty sections, all of these sitting at the same time, it was quite impossible for us to even know all that was going on. We think, however, that we have mentioned the most important contributions.

The Congress did one thing which it seems to us was of very questionable value. At a so-called general session, attended by some sixty delegates, many of these sitting as mere spectators, a number of resolutions were passed. Some of these were simply absurd, inasmuch as they stated with all gravity the most simple propositions in sanitation, propositions to which the merest tyro in hygiene would assent. Other resolutions were still more out of place. One of these recited as the sense of the

Congress that all should read and study a book written by the mover o the resolution. In our own enterprising country, where the book-agen prevails, we have seen many shrewd things done in order to induce peo ple to buy a certain book, but for a member of a scientific body to intro duce a resolution that his own book be read, and have this resolutio passed by an international congress, was a little more than we had eve seen before. We are glad to state that Doctor Billings, an Americai delegate, repeatedly protested against this action of the Congress.

VICTOR C. VAUGHAN.
F. G. NOVY.

Ann Arbor, Michigan, October 24, 1894.

THE CARE OF POOR PERSONS HAVING A DANGEROU COMMUNICABLE DISEASE IS A CHARGE UPON THE COUNTY, UNDER §1647 HOWELL'S STATUTES.

AN OPINION BY THE ATTORNEY GENERAL OF MICHIGAN.

The question of caring for persons having a dangerous communicabl disease had often come to the attention of the Secretary of the Stat Board of Health. This time the question was whether the townshi system of caring for the poor interfered with the care of poor by th county under §1647 Howell's Statutes. The attorney general has give his opinion that it does not and his opinion is as follows:—

STATE OF MICHIGAN,
ATTORNEY GENERAL'S OFFICE.
Lansing, Oct. 18, 1894.

Hon. Henry B. Baker, Lansing, Mich.

DEAR SIR:—Your favor asking where, under section 1647 of Howell's Statutes, the Board of Health of township has employed a physician and furnished medicine to parties, within their respective township infected with a contagious disease, and the bill for such services has been duly allowed by the Board Health, is it a charge upon the county where the township system of caring for the poor is in vogue, received and considered.

In reply would say that the law relative to the liability of counties for the expense incurred in carin for persons afflicted with contagious diseases, when such persons or their relatives are unable to bear suc expense, is not affected, either directly or indirectly, by the law relative to the support of the poor b the public. They are entirely distinct, one forming Title 12 of Howell's Statutes, entitled "Of the publ health." The other is Title 18 of Howell's Statutes, and is entitled "The support of poor persons."

The fact, therefore, that the township system of caring for the poor is in vogue in any particular count would not affect its liability in the case stated by you.

Respectfully,

A. A. ELLIS,
Attorney General.

ELIGIBILITY AND QUALIFICATIONS OF A HEALTH OFFICER.

OPINION BY THE ATTORNEY GENERAL OF MICHIGAN.

The question of the "Eligibility and Qualifications of a Health Officer" had often been asked the office of the State Board of Health. As the law was not altogether plain and there were some technical points of law, it was thought best to obtain a statement from the attorney general of Michigan, which, would, for a time at least, greatly assist the Secretary of the State Board of Health in answering questions of local officers and others. The opinion is as follows:—

STATE OF MICHIGAN,
ATTORNEY GENERAL'S OFFICE,
Lansing, June 28, 1895.

Hon. Henry B. Baker, Secretary State Board of Health, Lansing, Mich.

DEAR SIR:—Your communication received requesting my opinion upon the following questions:

First—"Would it be legal for a person not a citizen of the United States to hold the position of health officer of a township, city or village?"

Second—"Would it be legal for a person not an elector to hold a position of health officer of a township, city or village?"

Third—"Who are electors?"

In answer to your first and second questions I will state that the right to hold a public office under our political system is not a natural right; and where it exists it is by virtue of some law expressly or impliedly creating and conferring it.

The qualifications which will entitle one to hold and exercise a public office may be set forth and declared in the constitution; and where the constitution has made no provision, the legislature may prescribe the qualifications necessary to the holding of an office. And where no limitations or qualifications are prescribed for the holding of an office by the constitution or legislature, the right to hold a public office under our political system is usually, but not always, an implied attribute of citizenship, and is presumed to be coextensive with that of voting at an election held for the purpose of choosing an incumbent for that office. But this is not a universal rule.

The constitution of this state does not prescribe the qualifications of a health officer of a township, city or village. The legislature of this state has, however, enacted a law,—section 1634 of Howell's Annotated Statutes—which prescribes the qualifications of a health officer of a township; and the only qualification necessary is, that the health officer shall be a well educated physician.—This is not altogether necessary; for there is a provision in that section which states that "in townships where it is not practicable to secure the services of a well educated and suitable physician, the board may appoint the supervisor, or some other person as such health officer." In a city the qualifications necessary to be a health officer may be prescribed in the charter, city ordinance, or possibly by the rules of the board of health of the city. In villages the village council may act as the board of health of the village, or they may establish a board of health for the village and appoint officers and make rules for its government, and invest it with such powers and authority as may be necessary.

You will readily see that it is impossible for me to fully answer the question as to cities and villages, without examining the charter, ordinances and rules laid down by the board of health of each city or village separately. Or it is possible for a city to have some special legislation in regard to the board of health and its officers, by which the legislature has prescribed certain qualifications necessary to entitle one to become a health officer.

I am of the opinion that it is not necessary for a person to be a health officer to be a citizen of the United States or an elector, unless the city charter or ordinance, or rules of the board of health, or some special act of the legislature requiring a person, in order to be entitled to hold such office, to be a citizen or an elector; and this would have to be determined by examining each city or village in regard to this matter.

In townships it is not necessary for a person to be an elector or a citizen of the United States, in order to hold the position of health officer.

In answer to your third question "Who are electors?" I will state that an elector is any person who has the right to vote, and that is determined by Sec. 1 of Article 7 of the State Constitution.

Yours truly,

FRED A. MAYNARD,
Attorney-General.

NATIONAL CONFERENCE OF STATE BOARDS OF HEALTH.

The tenth annual meeting of the National Conference of State Boards of Health was held at the Ebbitt House, Washington, D. C., Dec. 12, 1894; the first session convening at 10 A. M.

The following is the program which was arranged by the executive committee:—

Proposed by the State Board of Health of Michigan:

1. (a) How can State Boards of Health best accomplish the restriction and prevention of Consumption? (Discussion to be opened by Dr. P. H. Bryce, of Ontario.)

(b) Is it possible to have united action throughout this country on this subject? (Discussion to be opened by Dr. C. O. Probst, of Ohio.)

Proposed by the State Board of Health of Pennsylvania:

2. What is the best method for governmental dealing with tuberculosis in cattle? (Discussion to be opened by Dr. Florence O. Donohue, of New York.)

Proposed by the State Board of Health of Connecticut:

3. The necessity for legislation to give the State Board of Health in each State power to enforce its orders and recommendations relating to public health. (Discussion to be opened by George P. Ingersoll, Esq., of Connecticut.)

Proposed by the State Board of Health of Kentucky:

4. Should Medical Colleges be required to devote an adequate time to instruction in Hygiene, and exact of candidates for the degree of Doctor of Medicine an examination in this branch of medical education? (Discussion to be opened by Dr. Richard H. Lewis, of North Carolina.)

Proposed by the State Board of Health of Wisconsin:

5. Shall the State maintain supervision of the propagation of vaccine virus? (Discussion to be opened by Dr. J. W. Scott, of Illinois.)

Proposed by the State Board of Health of Ohio:

6. What measures should be taken by the State Boards of Health to prevent the conveyance of smallpox contagion by tramps? (Discussion to be opened by Dr. C. N. Hewitt, of Minnesota.)

Proposed by the State Board of Health of Michigan:

7. (a) Just what National Health Legislation is most important at this time? Is it most important that such legislation be for the creation of a National Health Service which shall deal with the most important causes of sickness and of mortality in the United States, with reference to their causation, restriction and prevention? (Discussion to be opened by Dr. Henry P. Walcott, of Massachusetts.)

(b) Should future legislation relating to quarantine be based upon the theory that the general Government should have quarantine jurisdiction, and perform quarantine duties, at all United States ports of entry, leaving to the States, unimpaired, all the powers they now exercise, to make and enforce such rules and regulations as they may deem necessary to secure the safety of their inhabitants? (Discussion to be opened by Dr. Irving A. Watson, of New Hampshire.)

Proposed by Secretary of Ohio State Board of Health:

8. Rules and Regulations of the Marine Hospital Service Governing Inter-State Quarantine. Address, by Walter Wyman, M. D., Supervising-Surgeon General of the U. S. Marine Hospital Service, Washington, D. C.

It will be seen by the above program that the Michigan Board proposed several very important questions which were discussed at the meeting. It had been expected that at least two of the members of this Board would be present, president Frank Wells and secretary Henry B. Baker, having been appointed by the Board as delegates to that meeting; but, as the year closed it was found that the appropriation of the Board was so nearly exhausted for that year, that it would not be practicable to send the delegates. However, president Wells sent the following communication which was read before the Conference:—

A PLEA FOR AN EFFICIENT NATIONAL SYSTEM OF QUARANTINE.

The threatened invasion of the country by cholera in 1893 led to the enactment by Congress, in February of that year, of the "Act granting additional quarantine powers and imposing additional duties upon the Marine Hospital Service." This act marked a long step in advance upon previous National Legislation for the prevention of the importation into our country of dangerous contagious diseases.

It aimed to accomplish this by not only guarding our own ports of entry but by also guarding ports of embarkation in Europe. It sought to prevent those who might become bearers of contagion from crossing the Atlantic to our shores and at the same time provided that should any so cross they should not be permitted to travel beyond the port of entry until all danger from their presence had ceased.

The invasion did not take place and it is but fair to assume that the measures adopted by the Marine Hospital Service under this act is largely responsible for this happy result.

This service had much to contend with in getting into some condition of efficiency the unequipped and in every way unreliable so-called quarantine stations along our extended sea-board. With but two or three notable exceptions these stations conducted under the authority of the various states where they existed often by ignorant and unexperienced men, act without system or concert of action, became restrictions and taxes upon commerce instead of barriers against the introduction of dangerous diseases. While much yet remains to be done to place our vast coast-line in a properly defensive condition to resist the inroad of these foes of life and health enough has been accomplished since the act went into effect to prove that by the National Government only can this work be most perfectly and economically performed.

Several of our largest and most important ports are still substantially under State authority in any defense offered by them against the pauper diseases of Europe. The largest of these, the port of New York has no sanitary equipment commensurate with its vast importance as being the chief channel through which flows to our shores a ceaseless throng from the slums of the eastern World. This throng is a daily menace to the health and lives of the inhabitants of every interior State. Consumption, diphtheria, measles and small-pox pass through this port unchallenged and unchecked, because unseen, in the baggage and effects of

immigrants who scatter the seeds of these dangerous diseases among these 65,000,000 of people among whom they make their homes.

The report of a Committee appointed by this Conference at its meeting in New York in April, 1893, to consider the condition of the New York Quarantine Station states that "The facillities for the disinfection of baggage and bedding are deemed entirely inadequate" and also "it appears that no disinfection of immigrants' baggage other than on vessels has been practiced at the port of New York since last October, and this Conference formally protests against the continuance of this neglect."

The reasons why States in which are located large ports of entry decline to relinquish the quarantine service at such ports to the general government is well understood.

The toll levied upon commerce for this purpose is sufficient to keep large numbers of men employed in the various departments of the service all of whom are regarded as valuable for partisan purposes. Under these circumstances the work of quarantine when performed by the States will never be efficient or satisfactory, and the interior States will suffer from the neglect and incompetency of those maritime States which make a show of performing this duty.

The necessity which I believe exists that this work be done by the federal government has been so often and so ably argued that I will not take up the time of the Conference by views upon this subject from any new standpoint. In suggesting further Congressional action, which, under present conditions I regard as extremely important, I wish to call your attention to the theory upon which a portion of the present law is based, and to ask you to consider if such is likely to accomplish the best results. Under the Quarantine act approved Feb. 15, 1893, the Surgeon-General of the Marine Hospital service is directed to "Coöperate with and aid State and municipal boards of health in the execution and enforcement of the rules and regulations of such boards" and also to establish quarantine regulations where none exist under State authority, or are regarded, if existing, as inefficient. The Act thus makes the National Government, in this matter subordinate to the State and local authority and does not permit the former to act unless it is shown that the rules and regulations of the latter are, in the opinion of the Surgeon General of the Marine Hospital Service, inadequate. It is this theory that State and local authority should be supreme, instead of the authority and power of the United States, in this matter of such general interest and importance, which I consider radically wrong. My belief is that the reverse should be the case, and that in maritime and border quarantine the general government should be supreme.

I believe the only efficient protection the people of the United States can have against the continual introduction into their borders of many communicable diseases from abroad is the equipment at all ports of entry by the federal government, of the most efficient and scientfic appliances for the disinfection of baggage and effects, and the enforcement of general rules and regulations at such ports whereby immigrants and their belongings shall cease to be a menace to the health and lives of our people.

An act embodying this view could, and probably would, in practice, be supplemented by a corps of sanitary experts whose tenure of office would be secure, and whose experience and scientific skill would prove a safeguard, against pestilence, of the greatest value. Such an act should not

rtake to deprive States or municipalities of power for all local quaran-
or sanitary work, or to exercise such power to supplement the efforts
e general government, should the latter at any time in the estima-
of these States or municipalities prove derelict in its duties under
aw. The present theory would thus be reversed and States would
w in this work, when necessary, but never lead. The constitutional
tion, I have neither time nor ability to discuss but I believe that the
e that grants to Congress power to provide for the common defense
general welfare of the United States is ample authority for the legis-
n needed. The peril which brooded like a night-mare over our land
r ago seems to have passed. Cholera seems to have retired to its
ral haunts upon the banks of the Ganges. But we are still menaced
daily suffer from many other foes which destroy less rapidly, but not
surely than cholera. Keep these enemies from our borders in the
ble way, systematic and compulsory disinfection by the United
s of everything dangerous which reaches our shores. Stamp them
promptly by local authority, wherever in State or municipality they
their loathsome forms, and the next generation will witness a mil-
ium of health undreamed of a score of years ago.

FRANK WELLS,
President Michigan State Board of Health.

sing, Michigan, December 10, 1894.

STEAM DISINFECTION.

a letter dated June 18, 1895, Doctor James D. Munson, Medical
rintendent of the Northern Michigan Asylum for the Insane, at Trav-
City, asked the following questions relative to a steam disinfecting
for the asylum:—

connection with the new laundry building which we are about to construct, we wish to build a
ing room. I mean by this a room that can be super-heated, and in which we can sterilize the bed-
d clothing of phthisical patients at such times as may be necessary to insure safety to our house-
You know the only means we now have is either to fumigate or scald them. Either method is
tly destructive to clothing, and I do not think the results any better than would follow from dis-
on by heat. Can you inform me how such a room should be constructed? Have you plans of any
oms? If the scheme is feasible, what degree of heat is necessary to insure absolute disinfection?
team heat is used, what steam pressure will be required to produce the degree of heat necessary?"

e following correspondence between Doctor Munson and the secre-
of the State Board of Health will explain itself and is as follows:—

(Copy.)

STATE BOARD OF HEALTH, MICHIGAN.
OFFICE OF THE SECRETARY.
Lansing, June 21, 1895.

D. Munson, M. D., Med. Supt. Northern Mich. Asylum, Traverse City, Michigan.

DOCTOR:—Replying to your letter of June 18, according to Sternberg (pages 577-8) Vol. 1, "Sys-
Practical Therapeutics, Hare"—"A temperature of 60° C. (140° F.) is fatal to all of the patho-
acteria in the list with the exception of the tubercle bacillus and anthrax spore." But this is
at; dry heat is far less effective. "Koch and Wolfhugel found, as a result of extended experi-
that the spores of bacilli require for their destruction in dry air a temperature of 140° C. (284° F.)
ined for three hours." "The experiments of Esmarch show that superheated steam is less effective
eaming steam at 100° C. It has about the same value as dry air at a corresponding temperature.
an important practical point which should be kept in view in constructing steam disinfecting
ns."

In this connection, in directing for the construction of such apparatus, during our quarantine against cholera, consumption, diphtheria, etc., we directed that the room should be so constructed that the steam should escape from the *lowest part of the room*, in order that the coldest air and steam should escape.

The disinfecting room should be fitted up with steam coils so as to supply a good degree of dry heat, also with a pipe to deliver live steam. In practice, the room should first be heated by means of the coils, then live steam should be forced in until it streams out at the bottom, at a temperature of 212° F. After maintaining this temperature for a few minutes*, the live steam should be turned off, and when the room is opened it should be very gradually, so that the steam will all escape and leave the goods dry.

All articles which are glued, such as violins, and other similar musical instruments, all articles of leather, *furs*, etc., will be destroyed by such methods of disinfection. Woolen goods are liable to be shrunken out of shape. This however is believed to be the most certain way of disinfecting.

If there is any point I have not covered, I shall be glad to make another attempt to answer.

Very respectfully,

HENRY B. BAKER,
Secretary.

NORTHERN MICHIGAN ASYLUM,
Traverse City, Mich., June 24, 1895.

DEAR DR. BAKER:—Many thanks for your valuable letter of June 21st. Our sterilizing room will be 10x14 ft., and with the exception of a window and door, which we will try to make as nearly air tight as possible, will be constructed of brick and cement. One point which I particularly wish to know and which was not mentioned in your letter is, how many pounds steam pressure must we carry in our steam supply pipes in order to raise the temperature of the air in this room to 284° F.? Your suggestions in regard to having both live and dry steam in the room, and also for the removal of the steam from the floor, are valuable. My idea is to have a perfect room, and we wish to incorporate in it the most scientific data obtainable. I am under many obligations to you, and trust you will be able to give me the information asked for above.

With kind regards, believe me,

Sincerely yours,

JAMES D. MUNSON.

(Copy.)

OFFICE OF SECRETARY OF THE STATE BOARD OF HEALTH,
Lansing, Michigan, June 25, 1895.

James D. Munson, M. D., Med. Supt. of Northern Michigan Asylum, Traverse City, Michigan.

DEAR DOCTOR:—Replying to your letter of June 24, I do not know what pressure must be carried in the steam supply pipes in order to raise the temperature of the air in the room you propose to heat to 284° F. I remember at Boston Harbor seeing the temperature in a small room raised to 240° F. by steam through a rubber hose from the boiler of a tug. I think the pressure there was 125 pounds.

I do not think you can use a temperature above about 240° F. or 250° F. without destroying the goods; and if the goods are to be destroyed they may as well be burned in a furnace.

Very respectfully,

HENRY B. BAKER,
Secretary.

PUBLIC-HEALTH LEGISLATION AND PROPOSED LEGISLATION IN MICHIGAN IN 1895.

The State Board of Health was called in special meeting, Feb. 1, 1895, for the purpose of again considering just what legislation would be asked for by the Board. Numerous bills were discussed, as can be seen by referring to the proceedings of the meeting printed on pages xxvi-xxx of this Annual report.

*According to Sternberg, four minutes at 212° F. destroys Anthrax and Tuberculosis; and he considers that Anthrax supplies as high a standard as is necessary. But time must be given to heat through all bundles or foldings.

H. B. B. *Sec.*

The following is a list of titles of bills which were approved and recommended by the Board:—

(1) *House Bill 263, File No. 99, Introduced by Mr. Allen, of Eaton Co.:*

A Bill to provide for the auditing and paying of bills for expenditures for the office of the Secretary of the State Board of Health.

In the House the bill was referred to the Committee on Public Health, reported favorably, and by request of Mr. Allen was laid on the table.

(2) *House Bill 389, File 154. Introduced by Mr. Waite, of Menominee Co.:*

A Bill to provide for teaching in the public schools the modes by which the dangerous communicable diseases are spread, and the best methods for the restriction and prevention of such diseases.

Referred to Committee on Public Health, and ordered printed for use of Committee, reported favorably. Passed the House.

In Senate referred to Committee on Education, reported favorably, passed Committee of the whole May 9, passed the Senate May 10, vote 23 to 0. Approved by the Governor. It is Act 146, Laws of 1895.

(3) *House Bill 571, File , Introduced by Mr. Smiley, of Calhoun Co.:*

A Bill to amend section 1 of act No. 241 of the public acts of 1881.

This bill provides for additional appropriation for Sanitary Conventions, etc. It was referred to Committee on Public Health.

In the House the bill was referred to Committee on Public Health where it remained until the last days of the Session when it was reported out with recommendation that it do not pass.

(4) *House Bill 609, File 152. Introduced by Mr. Donovan, of Bay Co.:*

A bill to provide for the enforcement of the public-health laws in townships, cities and villages when local authorities fail to act.

Referred to Committee on Public Health, and ordered printed for use of the Committee, reported favorably, passed Committee of the whole May 6, passed House May 7, vote of 73 to 0; in the Senate reported favorably by Committee on Public Health, passed Committee of Whole May 14.

(5) *House Bill 739, File , Introduced by Mr. Smiley, of Calhoun Co.:*

A Bill to provide for the employment by the State Board of Health of one or more communicable disease inspectors.

Referred to Committee on Public Health, where it remained until the last day of the session when it was reported out with the recommendation that it "do not pass."

(6) *House Bill 785, File , Introduced by Mr. Allen, of Eaton Co.:*

A bill to amend section 2 of act No. 167, laws of 1883, entitled "An act to promote public health," as amended by act No. 268, laws of 1887, and to add a new section to said act to stand as section 8.

A Bill with a similar title was introduced in the Senate (Senate Bill No. 431, introduced by Mr. Gaige of Sanilac.) In the House the bill was referred to Committee on Public Health where it remained until the last days of the session when it was reported out with recommendation that it do not pass.

(7) *House Bill 786, File 212, Introduced by Mr. Allen, of Eaton Co.:*

A Bill to prevent the introduction of a dangerous communicable disease into any township, city or village in Michigan except under specified regulations.

The bill was referred to Committee on Public Health, reported favorably, passed the House March 19, vote 58 to 3; in the Senate reported favorably by Public Health Committee, passed the Senate March 27, vote of 26 to 0. It is Act 45, Laws of 1895.

(8) *House Bill 816, File 153, Introduced by Mr. Fisk, of Wayne Co.:*

A Bill to authorize the destruction of infected clothing, bedding, etc., and to provide for compensation therefor by the township, city or village.

Referred to Committee on Public Health and ordered printed for use of Committee, reported favorably.

(8½) *House Bill 828, File , Introduced by Mr. Waite, of Menominee Co.:*

A Bill to establish a State Hospital for Consumptives and to make an appropriation therefor.

Referred to Committee on State Affairs in the House.

A Bill with a similar title was introduced in the Senate (Senate Bill 433, introduced by Mr. Janes of Hillsdale Co.).

A copy of this Bill is printed in this Annual Report on pages xxviii-xxx.

(9) *House Bill 923, File , Introduced by Mr. Harris, of Charlevoix Co.:*

A Bill to require of each school teacher a physician's certificate of freedom from dangerous communicable disease, in order to protect pupils in public and private schools from exposure to such diseases.

In the House the bill was referred to Committee on Public Health, where it remained until the last days of the session when it was reported with the recommendation that it do not pass.

(10) *House Bill 924. File 155, Introduced by Mr. Harris, of Charlevoix Co.:*

A Bill to amend sections 1675 and 1676 of Howell's annotated statutes as amended by act No. 11 of the laws of 1883.*

(11) *House Bill 131, File 60, Introduced by Mr. Campbell, of Ingham Co.:*

A Bill to provide for the immediate registration and prompt return and compilation of births and deaths in Michigan.

The Bill was referred to Committee on Public Health and ordered printed for use of the Committee. A Bill with a similar title was introduced into the Senate (Senate Bill 61, File 23, introduced by Mr. Janes, of Hillsdale Co.).

(12) *Senate Bill 430, File , Introduced by Mr. Gaige, of Sanilac Co.:*

A Bill to amend sections 3, 4, 5 and 6 of act No. 230, laws of 1885, entitled "An act to provide for the prevention of the introduction and spread of cholera and other dangerous communicable diseases," as amended by act No. 47, laws of 1893, and to add 3 new sections thereto to stand as sections 8, 9 and 10.

Introduced "by request," and referred to committee on public health. A bill with a similar title was not introduced into the House.

The following is a list of titles of Bills, affecting public-health interests, which *were not* recommended by the State Board of Health. Most of them were not presented to or considered by the State Board of Health.

(13) *House Bill 90, File 74, Introduced by Mr. Mathews, from Wayne Co.:*

A Bill to prevent the adulteration of drugs, food and spirituous, fermented, or malt liquors in the State of Michigan.

The Bill was referred to Committee on Liquor Traffic, and ordered printed for the use of the Committee.

(14) *House Bill 163, File 62, Introduced by Mr. Fisk, of Wayne Co.:*

A Bill to provide for the compensation to persons isolated by order of a health officer, or by a board of health, because exposed to or infected with a dangerous disease.

Referred to Committee on Public Health, ordered printed, reported for general order in Committee of Whole, and tabled by motion of Mr. Fisk.

(15) *House Bill 693, File 121, Introduced by Mr. Miller, of Kalamazoo Co.:*

A Bill to provide for the appointment of a State Board of Health Commissioners, to make necessary appropriations therefor, and to repeal Act No. 81 of the public acts of 1873, entitled "An act to establish a State Board of Health, and to provide for the appointment of a Superintendent of Vital Statistics, and to assign certain duties to local boards of health" being sections 1622 to section 1632 inclusive of Howell's annotated statutes, and to repeal all acts and parts of acts inconsistent with the provisions of this act.

This bill was referred to Committee on Public Health, reported favorably March 27, special order April 10 at 7.30 when it passed the Committee of the Whole, but failed to pass on third reading by a vote of 48 to 36.

(16) *House Bill 699, File , Introduced by Mr. Waldo, of Wayne Co.:*

A Bill to add to the powers of the State Board of Health and to define its duties in certain cases.

This bill was tabled on introduction.

(17) *Senate Bill 329, File 247, (Reprint File No. 264.), Introduced by Mr. Bialy, of Bay Co.:*

A Bill to amend sections 1, 3, 4 and 5 of act No. 81 of the laws of 1873, entitled "An act to establish a State Board of Health, to provide for the appointment of a superintendent of Vital Statistics, and to assign certain duties to local boards of health," approved April 12, 1873.

Tabled on introduction, afterwards referred to Committee on Judiciary in Senate, reported favorably April 12, passed the Committee of the Whole April 25, and passed the Third reading May 9, by a vote of 9 to 17. This bill went to the House, referred to Committee on State Affairs, where it died, because it was voted by the Committee to pigeon hole the bill. Several attempts were made to get the bill out of the Committee but to no avail. On May 24, on motion of Mr. Aplin, of Bay Co., to order the bill from the Committee, the House refused to so order, the vote being a rising one 25 to 30.

*This proposed change in the public health law to have all reports of dangerous communicable diseases made to the health officers, was advocated by the Secretary at the regular meeting of the State Board of Health, at Lansing, April 12, 1892. This amendment to the law makes it unnecessary for the State Board of Health to ask for annual reports relative to communicable diseases to be made by the clerks of local boards of health.

Referred to Committee on Public Health and ordered printed for use of Committee, reported favorably, passed May 7 vote of 56 to 1; in the Senate reported favorably by Committee on Public Health, passed Committee of Whole May 14, passed Senate May 15 vote of 22 to 0. It is Act 158, 1895.

(18) *Senate Bill No. 146, File No. 248, Introduced by Mr. Barnard, of Kent Co.:*

A Bill to establish a board of registration and to regulate the practice of medicine, and to repeal acts and parts of acts in conflict herewith.

This bill was referred to Committee on Public Health, reported favorably (two voting for and one against), passed Senate vote of 18 to 9; went to the House and referred to Committee on State Affairs, reported favorably, passed the House vote of 67 to 1. The bill went to the Governor, but was recalled from him for minor corrections. It again went to the Governor, where it remained until the last day of signing bills, when he vetoed the bill.

(19) *House Bill No. 119, File No. 61, Introduced by Mr. Kempf, of Washtenaw Co.:*

A Bill—To provide for the prevention of blindness in the newly born by compelling midwives, nurses and others to report in writing to the local health officer any redness or inflammation occurring in the eyes of infants under two weeks of age, and to provide a penalty for the neglect of the same.

Referred to Committee on Public Health in House, reported favorably, passed House vote of 66 to 0; reported favorably by Senate Committee on Public Health, passed Senate vote of 26 to 0, approved by Governor March 29, 1895. It is Act 43, 1895.

(20) *House Bill No. 482, File No. 250, Introduced by Mr. Kempf, of Washtenaw Co.:*

A Bill—To amend section fifteen of chapter thirty-five of the revised statutes of eighteen hundred forty-six, relative to the preservation of the public health, quarantine, nuisances and offensive trades, being section sixteen hundred forty-seven of Howell's statutes.

Referred to Committee on Public Health, passed the House March 28 vote of 69 to 1, on April 19 passed the Senate vote 21 to 0. It is Act 97, 1895.

(21) *House Bill No. 382 (Manuscript copy), Introduced by Mr. Taylor, of St. Clair Co.:*

A Bill—To make townships, cities and villages in St. Clair county primarily liable for the payment of all claims incurred in the case of persons sick with contagious diseases, or diseases dangerous to the public health, or incurred in preventing the spread of such diseases, where said county is now primarily liable for such payment.*

(Notice of the introduction of a bill with a similar title was given by Senator French, but it is not known whether such a bill was really introduced in the Senate.)

It is Act 391, Local Acts of 1895.*

(22) *House Bill No. 251, File No. , Introduced by Mr. Chamberlain, of Gogebic Co.:*

A Bill to amend section 10 of Act No. 81, session laws of 1873, entitled "An act to establish a State Board of Health; to provide for the appointment of a superintendent of vital statistics and assign certain duties to local boards of health," as amended by act No. 107, session laws of 1883.

The Bill was referred to Committee on State Affairs where it remained until the last day of the session when the bill was reported out with the recommendation that it "do not pass."

(23) *House Bill No. 549, File No. , Introduced by Mr. Partridge, of Wayne:*

A Bill to regulate the practice of Medicine and surgery in the State of Michigan.

On motion of Mr. Partridge the bill was laid on the table.

(24) *House Bill No. 552, File No. 449, Introduced by Mr. Partridge, of Wayne:*

A Bill to more clearly define nuisances and to provide surer means for their abatement.

On motion of Mr. Partridge the Bill was tabled on introduction, afterwards referred to Committee on Public Health who recommended a substitute as follows:

A Bill to more clearly define nuisances and to provide surer means for their abatement, and to regulate the slaughtering of animals and the maintaining and operating of abattoirs or slaughter houses in the city of Detroit.

Passed the Senate May 27, vote of 28 to 0.

(25) *House Bill No. 564, File No. , Introduced by Mr. Partridge, of Wayne:*

A Bill to amend an act regulating the use of illuminating oils, prescribing the method of testing such oils and prohibiting the use of inferior grades of oils.

On motion of Mr, Partridge the Bill was tabled, on introduction.

(26) *House Bill No. 578, File No. , Introduced by Mr. Donovan, of Bay Co.:*

A Bill to amend act No. 77 of the public acts of 1889, entitled "An act to prohibit the selling, giving or furnishing tobacco, in any of its forms, to minors, and providing a penalty therefor."

The Bill was referred to Committee on State Affairs.

Senate Bill No. 505 with a title similar to the foregoing was introduced by Senator Jewell, and was referred to Committee on Public Health.

*This is substantially the same plan for St. Clair County as was proposed for the entire State in a bill prepared by the State Board of Health a few years ago, but which failed to become a law. The State Board of Health then thought it for the public-interest, especially as to economy.

(27) *House Bill 607, File No.* , *Introduced by Mr. Donovan, of Bay Co.:*

A Bill to provide for the ventilation of public school rooms.

The Bill was referred to Committee on State Affairs, who recommended a substitute with the following title:

A Bill to provide for the ventilation of public buildings.

(28) *Senate Bill No. 290, File No.* , *Introduced by Mr. French, of St. Clair:*

A Bill to regulate the practice and define the duties and responsibilities of medical practitioners in the case of certain infectious and contagious diseases.

The bill was referred to Committee on State Affairs.

(29) *Senate Bill No. 307, File No.* , *Introduced by Mr. Eaton, of Lenawee:*

A Bill to regulate the practice of Medicine in the State of Michigan and to repeal act No. 81, public acts of 1873, entitled "An act to establish a State Board of Health, to provide for the appointment of a superintendent of vital statistics, and to assign certain duties to local boards of health," approved April 12, 1873.

The Bill was referred to Committee on State Affairs.

(30) *House Bill 398, File No.* , *Introduced by Mr. Harris, of Charlevoix:*

A Bill to prevent the careless or malicious use of poison in certain cases and to provide a penalty for the same.

The Bill was referred to Committee on Judiciary.

(31) *House Bill No. 357, File No. 100, Introduced by Mr. Donovan, of Bay Co.:*

A Bill to regulate the business of plumbing and building drainage, and the conduct thereof in the State of Michigan.

Referred to Committee on Public Health, reported favorably, passed Committee of Whole April 29.

CLERKS, EXPENDITURES IN LAST FISCAL YEAR AND ESTIMATE FOR THE PRESENT YEAR.

Lewis M. Miller, Clerk of the House of Representatives, in a letter dated January 19, 1895, transmitted to the Secretary of the State Board of Health a resolution, which was adopted by the House of Representatives January 17, 1895, and read as follows:—

Resolved, That the different State Departments do furnish the House a full statement in detail, giving the number of employés in their respective departments; whether male or female, former occupation (if soldiers so state); their present place of residence; also former residence; how many years employed in the department; age; what wages paid to each employé; number of hours' labor performed per day; and whether regular or temporary in their employment. Each department shall also furnish an itemized statement of expenses in conducting said department for the last fiscal year; also an estimate in detail amount of money required for the present year.

In compliance with the foregoing resolution the following communication was sent from the office of the State Board of Health:—

STATE BOARD OF HEALTH,
Lansing, January 26, 1895.

To the Honorable Speaker and House of Representatives:

In compliance with a resolution of your honorable body, which I have received from the Clerk of the House, the following tables and statements supply the facts required:

All clerks in this office at present are "regular clerks," and at present all reside in the city of Lansing. The prescribed number of hours for each day's work is seven, except for the person who serves as clerk, messenger and janitor, who is required about nine hours each day. Except-

ing that employé, who receives $720, each clerk receives a salary of $1,000 per year. The following table supplies other facts required:

Names of clerks.	Sex.	Ex-soldier.	Former residence.	Years employed.	Age.	Former occupation.
C. W. Church	Male	No	Lansing	18	63	Merchant.
H. B. Turner	Male	No	Coldwater	15	53	Pharmacist.
E. H. McCallum	Male	No	Peninsular Tp.	10	63	Fruit grower.
W. C. Haines	Male	No	Bay City	10	57	Miller.
G. E. Willitts	Male	No	Athens	8	38	Teacher.
H. L. Thayer	Male	Yes	Lansing	6	57	Traveling agent.
Theo. R. MacClure	Male	No	Lansing	5	26	Student.
Mrs. G. P. Clark	Female	No	Albion	3	56	Housewife.
W. M. Force	Male	No	Howell	3	38	Law clerk.
G. H. Cattermole	Male	No	Ann Arbor	½	26	Physician.
S. H. Reynolds	Male	Yes	Eaton Rapids	5	58	Book agent.

The two appropriations for the Board are for the *calendar* year, and together amount to $6,000, and the expenditures cannot exceed that amount. The expenditures for a fiscal year may exceed the amount of the appropriation for the calendar year; and for the fiscal year ending June 30, 1894, the expenditures did exceed $6,000 for the reason that in the latter part of the calendar year 1893 or early in 1894 a proportionately large amount of the annual appropriations was used. The statement required by your resolution is as follows:

EXPENDITURES BY THE BOARD DURING THE FISCAL YEAR ENDING JUNE 30, 1894.

Expenses of members:—	
Attending meetings	$64 65
Other official	584 93
Paper, stationery, etc.	692 40
Instruments and books	184 86
Postage:—	
Office	1,250 00
Members	1 00
Printing and binding	732 91
Secretary's salary	3,000 00
Miscellaneous	204 42
Expressage	79 03
Telegrams	10 91
Telephone	40 00
Total	$6,845 11

The appropriations at the disposal of the State Board of Health are for certain specified purposes, not including clerk hire, the publication of the annual report, or the expenses in the examination of plans for public buildings; these expenditures on account of but not by this board are provided for by other acts of the legislature than those appropriating money to be expended by this board, and the accounts are kept in other offices; the accounts for clerk hire are kept in the office of the Auditor General, and the accounts for publication of the annual reports of this board, and for expenses in the examination of plans for public buildings are kept by the Board of State Auditors, therefore they are not under the control of this office, and I suppose such statements will go to you from those offices, either in their published annual reports or in response to resolution.

ESTIMATES FOR PRESENT FISCAL YEAR, AND SUCCEEDING YEARS.

The expenses for the present fiscal year might be estimated as about the same as for the fiscal year 1894, but it is unanimously the view of the members of the State Board of Health that the public health interests of the people of Michigan will be better subserved by the use of a few thousand dollars more in that sort of work which is now partly covered by the special appropriations under section 1628 Howell's statutes, and act 241 laws of 1881, and which now amount in all to $6,000 per calendar year.

For instance, more money is needed for sanitary conventions which should be held in at least half of the counties, whereas the board is now able to hold only from 2 to 6 per year. These conventions do for the public health interests, which may affect every man, woman and child in the State, what the farmers' institutes do for the interests of the agricultural classes upon which the people are so dependent. Accordingly the sanitary conventions are an important means for the advancement of great public interests. And such work may well be increased.

More money is needed to enable the Board to send an expert employé to investigate outbreaks of dangerous communicable diseases, for the purpose of aiding localities in stamping out those diseases, as the State Live Stock Commission sends the State Veterinarian to investigate such diseases in animals.

If the Legislature agrees to the view of the State Board of Health, it will grant an additional appropriation, of four or five thousand dollars per year, or "so much thereof as may be necessary" for purposes such as those just mentioned,—sanitary conventions, and communicable disease inspectors; or it will, in some other way, increase to that extent the means under the direct control of the State Board of Health.

Respectfully submitted,

HENRY B. BAKER,
Secretary.

[The above-mentioned communication was printed in the Legislative Journal, Feb. 12, 1895.]

Just prior to the date of the foregoing communication, a clerk (A. C. Gongwer) who had been in the office of the Board for a number of years, left the office for cause. Before he left the office, when he left and after he left, he threatened to do the Board and Secretary injury. He claimed that he had a friend in the legislature whom he could depend upon to do

anything he wanted of him. This "friend" proved to be Philip D. Miller, representative from the second district of Kalamazoo county, and when at home living at Schoolcraft, Kalamazoo Co. It seemed that what Mr. Gongwer had stated was true and that he could easily lead Representative Miller as he wished him to go. The first indication was a resolution which Mr. Gongwer said would appear in the Legislative Journal the day it did. The resolution was offered by Mr. Gongwer's friend (Mr. Miller), adopted by the House, and appeared in the Journal of Feb. 12, 1895, as follows:—

Resolved by this House of Representatives, That the secretary of the Michigan State Board of Health is hereby required to furnish this House, with as little delay as possible, a full statement of all expenses incurred and paid by said board during the year ending December 31, 1894. Such statement to show the amount paid as salary to the secretary; the amount paid as salary to the clerks in the office of the secretary; the amounts paid as traveling and other necessary expenses of the members of the board; the amounts paid under act 230, laws of 1885, being sections 1632*a*, 1632*b* and 1632*c*, of Howell's annotated statutes; and under the head of "sundries" all other amounts paid which do not appear under the preceding heads; also the amounts of bills contracted during that year and remaining unpaid on the first day of January, 1895.

Complying with the above resolution the Secretary of the State Board of Health sent the following communication to the House:—

STATE BOARD OF HEALTH,
Lansing, February 14, 1895.

To the Honorable the Speaker and House of Representatives:

Complying with the resolution offered by Mr. Miller and adopted by the House of Representatives February 12, I submit herewith a statement of the facts for the calendar year 1894, as follows:

All expenditures by the State Board of Health during the calendar year ending December 31, 1894.

Chemical analysis	$50 00
Expenses of members:	
Attending meetings	63 20
Other official	585 48
Instruments and books	208 32
Paper, stationery, etc.	209 44
Postage:	
Office	1,210 00
Members	1 00
Printing and binding	519 46
Secretary	3,000 00
Miscellaneous	52 71
Expressage	52 26
Telegrams	18 00
Telephone	30 00
Total	$5,999 87

There was no expenditure by the board classed under the head o "sundries." Some of the foregoing may have been so classed in th Auditor General's office.

The amount paid to the clerks in the office was $11,236.56.

The amount paid by this State, on vouchers certified by this board an approved by the Governor, under act 230, laws of 1885, *as amended b act 47, laws of 1893*, was $1,011.00. (This includes $460.00 expense incurred in 1893, not paid until 1894.)

The amount of bills for the State Board of Health contracted by th secretary during the year 1894 and remaining unpaid on the 1st day o January, 1895, was $519.63. (This amount has now been paid, havin been audited at the regular quarterly meeting January 11, 1895.)

Nearly all these latest questions were answered in my former statemen to the House, printed on pages 261 and 262 of the Legislative Journal but those statements were for the fiscal year, while these are for th calendar year 1894.

Very respectfully,
HENRY B. BAKER,
Secretary.

The above communication was printed in the Legislative Journal, o Feb. 14, 1895, and on the very same day Representative Miller gav notice that he would introduce a bill which purported to reorganize th State Board of Health, but practically would have destroyed that sort o public-health work previously done in Michigan. On Feb. 19, Rep Miller introduced his bill, which was referred to the Committee on Pub lic Health, consisting of: William Harris, of Norwood, Charlevoix, Co. Chairman; Charles P. Benoit, Jr., of Detroit, Wayne Co.; William R Edgar, of Blissfield, Lenawee Co.; G. W. Richardson, Dundee, Monro Co.; and J. D. Morse, of Otisco, Ionia Co.

Copy of a letter to the members of the State Board of Health, transmit ting the Secretary's reply to an interview with Representative P. D. Miller, which appeared in the Detroit Journal.

DEAR SIR:—Herewith please find a hektographed page "Referring to page 5, Detroit Journal, Feb. 20, from that page you will see that Mr. Gongwer's threat that he would make trouble is being fulfilled. H friend in the House of Representatives is Mr. Miller from Schoolcraft, Kalamazoo Co. He has introduce a bill (House bill 693 "File No. 121") a copy of which I send you herewith. It provides for the abolitio of the present State Board of Health and the repeal of the law under which the Board now acts. M Miller is very industriously working for the passage of this bill, and although the local reporters kno its animus, Mr. Miller has succeeded in having published in the Detroit Journal, and possibly in othe papers which I have not seen, statements relative to the expenses of the State Board of Health an other statements which are very erroneous and misleading. The hektographed page which I send here with replies to one such article supplied by Mr. Miller. This page has been handed to the reporter fo that paper (Joseph Grensel) who has given me to understand that it will be published in the Journal.

Feb. 20 I wrote to Hon. George H. Granger, member of this board and its committee on legislation a follows:—

"I see by the Legislative Journal that the Hon. Mr. Bialy, Senator from your district, has introduce a bill to amend several sections of the act establishing this Board. I do not know the purpose, perhap you have had conference with him on the subject? I mention this thinking that possibly you may no have knowledge of it, in which case, I think it is desirable to ascertain, if possible." To this, Docto Granger replies as follows: "The Governor will explain the amendments to the Gen. Law as introduce by Mr. Bialy." I am informed that Mr. Bialy is of the opinion that Mr. Miller's bill will satisfy th requirements of the bill introduced by him, therefore I took a copy of Mr. Miller's bill up with me whe

I went to interview the Governor. I understand that one of the objects which the Governor had in mind was suggested to the Board at the time the Board met in his Office, and was that the Secretary should not be a member of the Board. (I think it has been represented to the Governor that the Secretary has greater influence on the action of the Board than he should have.) Mr. Miller's bill provides that the Secretary shall not be a member of the Board.

Another purpose, which this bill is designed to accomplish, is to provide that the members of the Board, each in his own part of the State, shall be the Communicable-Disease Inspectors, and shall make the investigations, and shall receive ten dollars per day for such service. This is provided for in section three of the bill introduced by Mr. Miller. But the plan does not seem to be as good as that in the bill drafted by Prof. Fall and unanimously approved by this Board at its last meeting, providing for the employment of an expert. That bill has been introduced, and it is hoped that it will become a law.

Section 5 of the bill provides that the Secretary of the Board may be removed by the Governor, as well as by the Board as the present law provides. This might be convenient for some partisan Governor some time in the future.

I see no great objection to displacing the Secretary from membership, except that it is sometimes convenient to have the Secretary a member in order to obtain a quorum of the Board for the transaction of important business; and this bill would make it still more difficult to get a quorum than it has been, because this bill requires that six of the seven members shall be physicians, and our best physicians frequently have patients in such a condition that it would be a serious subject for them to leave and attend the meeting of the State Board of Health. By this bill, as by the present law, members have no compensation for *such* service. From the President of the United States down, Governmental precedents are in favor of the executive officer having influence in the enactment of measures to be executed. The Governor of the State has such influence that two-thirds of the Legislature is required to overcome his vote on a measure. The Secretary of the State Board of Health in this State has heretofore given his whole time and attention to the subject of public health. I see nothing in that which should disqualify him from voting on questions involving the action of the Board. However, personally, I have no great objection to this proposed change, and I shall not object if the members of this Board think the change should be made.

I have talked with the Governor about the proposed meeting of the Board here soon, and he favors it; and although his work is more pressing in the middle of the week, still he favors having the meeting at that time of the week, because then most of the members of the Legislature are present. Representative Fisk of Detroit, a prominent member of the House and one who understands something of what public-health work means for the people, says he would take pleasure in moving that the Hall of the House be granted to Prof. Vaughan and others for the purpose of placing before the members of the Legislature and others the *facts* bearing upon public-health questions which have been placed before this Legislature for decision. He thinks the House would grant the request. I expect soon to issue a call by the President of this Board for such a meeting, the President having had it in mind for a long time, and waiting only for the proper time to arrive.

This letter is written for the information of the members of this Board, and I shall be glad to have the view of any member of the Board on any of the subjects referred to.

Very respectfully,

HENRY B. BAKER,
Secretary.

OFFICE OF SECRETARY OF THE STATE BOARD OF HEALTH.
Lansing, Mich., Feb. 27, 1895.

Secretary Baker's reply to Representative Miller's "Interview" in the Newspaper, page 5, Detroit Journal, Feb. 20, 1895.

"Although the work of the State Board of Health has been investigated so many times, and so thoroughly, that it is well known to many that for every thousand dollars expended by the State on its account there is a saving in money values, incident to sickness and deaths prevented, of more than fifty thousand dollars, such savings amounting to more than half a million of dollars, annually, with reference to three diseases alone, yet such erroneous statements as that credited to Representative Miller tend to mislead persons not familiar with the facts. There is good reason to believe, however, that the statements are not original with Representative Miller, because, before Mr. Miller offered his resolution asking for details of expenditures, and before he gave out the statements to the reporters, it was reported that he was to attack the Board at the instance of a clerk who recently left the office of the Board, for cause. That clerk threatened that the legislation planned and recommended by the State Board of Health would

not be accomplished, and that he should see to it that it would be vigorously attacked. Since he left, and since Mr. Miller's action, he has inquired if the executive officer of the Board was "trembling;" and stated that he might well tremble. But the main reason for assuming that the statements in the Detroit Journal, Feb. 20, page 5, did not originate with Hon. Mr. Miller is that they are of such a nature that no honorable and sane person would be likely to make them; because on the same page and opposite page of the Annual Report of the Mass. State Board of Health for 1893, from which the statements credited to Mr. Miller were apparently taken, and in immediate context with the three lines quoted, it is shown that during the year 1893 the Mass. State Board of Health actually used more than fifty-seven thousand dollars; (instead of the $10,800 quoted for comparison with the Michigan expenditures); and there is also a reference to still other expenditures, detailed on another page. The Report shows that for the year 1893 the Mass. State Board of Health had appropriations aggregating at least sixty-eight thousand dollars. Its annual expenditures appear to have been three times as much as the Michigan Board has ever expended in any year. Then, again, it is alleged that "The Michigan Board, Mr. Miller finds, paid out $1,865.99 for printing alone in the year 1891—no later figures of the cost of the Board's printing being available." The Board has been working a great many years and its expenses for printing have not varied greatly in recent years, so that a statement for one year is about as good as for another, but a request by Mr. Miller or any other representative would undoubtedly bring the information for any desired year. And the law requires the board to collect and disseminate information, therefore its printing bill will naturally be large; but so long as it does not exceed the amount placed at the disposal of the Board by the legislature, it is difficult to see why fault should be found with that item.

"Each of the appropriations in Mass. must be used for the purposes named in the act; and the same is true in Michigan; but the appropriation for the general work of the Board in Mass. is more than double what it is in Michigan, being $10,800 in Mass. and $4,000 in Michigan. Yet the Michigan Board is ready to have the results of its general work or its special work compared with that in Mass. or in any other State."

The "hearing" on the "Miller Bill" before the Committee on Public Health in the House.

March 7, at 9:00 o'clock, the Committee convened for the purpose of hearing what was to be said for and against the Miller Bill. In behalf of the State Board of Health, President Frank Wells and Secretary Baker were present to argue against the Miller Bill. When the Committee convened and for some little time afterward, Mr. Miller was the only one there to advocate his Bill. By request of the Chairman, President Wells opened the argument against the bill, and read the following address which he had prepared for the occasion:—

OBJECTIONS TO THE MILLER BILL.

(Address by Hon. Frank Wells, President of State Board of Health, substantially as presented to the Public Health Committee of the House of Representatives.)

First, The change of name of "State Board of Health," to "State Board of Health Commissioners" is awkward and unnecessary, and without compensating advantages.

Second, The Bill provides that the members of the new Board shall be chosen in the same manner as those of the old now are, and it is difficult to see how any improvement in the character or efficiency of its members will be likely to result when no change is made in the method of selecting. Dictating that members shall, with a single exception, be physicians is unwise for the reason that Sanitary knowledge, good judgment and business ability are the characteristics which should distinguish the members of such a Board. Neither of these qualities belong exclusively to the medical profession. Sanitary knowledge has grown into a science during the last decade. It has little to do with the practice of medicine

and some of the most diligent and successful investigators in this field like Pasteur are not members of the medical fraternity. While it is true that physicians are interested in curing rather than preventing disease, yet many are among our best sanitarians, and should properly have places on boards of health. It is believed, however, that the appointing power should not be in any way limited, but should seek from all classes for such as seem from their knowledge and ability especially fitted for this important work.

Third, To charge the members of such a Board with the duty of investigating outbreaks of contagious diseases has been found from the experience of the State Board of Health impracticable. Every *good* practicing physician has a list of patients many of whom he receives at his office, or visits daily and he will rarely be willing to leave this work, go to distant localities and spend the time necessary for properly performing that portion of the duty assigned to members of this Board, by this Bill. The class of physicians who would undertake to do this for ten dollars per day, are not such as the important health interests of this State should be entrusted with.

They belong to the class who, having failed to obtain a lucrative practice would seek to secure positions upon this Board having in view $10 per day, rather than the interests, of the people.

The members of the State Board of Health, under the existing law, receive no compensation for their services.

The end sought to be obtained by this portion of the Bill is much better secured, we believe, by another Bill now before the Legislature. (House Bill No. 739.) That Bill provides for the employment by the State Board of Health of an expert, who shall be paid a regular salary, and who shall perform regular clerical duties in its office when not engaged in this special work of investigating outbreaks of dangerous communicable diseases.

Usually, localities are able and willing to cope with these outbreaks, and in the rare instances where they are unable or unwilling to do so, and an appeal is made to the State Board for assistance, it is important that not only a competent diagnostician be sent for this purpose, but that the one so sent shall be thoroughly familiar with all the laws of the State which relate to the public health.

Both economy and efficiency will, we believe, be much better subserved in this line of duty by the latter Bill than by the one under consideration.

We do not think the salary of a Secretary of the Board should be restricted to two thousand dollars per year.

The scientific knowledge, judgment and experience that should be in the possession of a person capable of properly performing the duties of this Office are rare.

When such a person is needed it is often found difficult to secure his services at any price.

Wisdom would seem to dictate that in the employment of a person to perform duties which are second to none in importance to the people of the State the best person available should be secured and that he should be paid a salary in some degree proportioned to the value of the services rendered by him.

In some lines of duty the public interests may not be seriously jeopardized by the employment of cheap officials, but in this they are very sure to be.

The number of clerks which this Bill provides may be employed is inadequte to carry out the lines of work necessary for restricting and stamping out the dangerous communicable diseases which are constantly appearing in our borders. Unless the Board contemplated in this Bill continually taking advantage of the provision which permits it to employ extra clerks "in cases of emergency." To undertake to do this work properly for the entire State with the number of employes limited to those first named in the Bill would invite the spread of epidemics and place our citizens in the unprotected condition which prevailed twenty years ago when small-pox, diphtheria, scarlet fever and other similar dangerous diseases, undisturbed in their inroads, carried to untimely graves thousands who might have been saved. Take away the means whereby the Michigan State Board of Health has been enabled during the twenty-one years of its existence to save tens of thousands of lives and you may save to the State each year a small proportion of what one of the lives may be worth, but is this good economy, is it justice?

The reputation of the Michigan State Board of Health is not confined to Michigan or even to the United States.

The works of this Board have been studied, and its methods adopted by similar organizations all over the land. It has been a pioneer in several fields of work which have shown splendid results in the restriction and prevention of disease and the saving of human life. Its latest step in this direction is its most promising one. It has begun a warfare against that greatest foe of mankind—consumption, and hopes to deal such blows against this deadliest of all diseases that it will eventually become as rare as leprosy which, common in England two or three generations ago, has long been entirely stamped out.

It is the ambition and hope of this Board to eventually save to the State and to their families two or three thousand persons who annually become victims of consumption in Michigan. Other States are now rapidly following the lead taken by this Board in its action relative to consumption, and it is justly proud that such action is likely to benefit these other States equally with our own. All this work costs Michigan about $20,000 annually, but as our population increases and the rapid advance in scientific knowledge is constantly presenting new avenues for profitable life-saving work, this amount is inadequate and the present or any future Board, having in charge the important labors which the law has thus far entrusted to the Michigan State Board of Health should not be restricted for means to accomplish all that their wisdom and experience teaches them may be done in the prevention of the spread of all the dangerous communicable diseases in Michigan.

No money can be more wisely expended nor show more valuable results for there is nothing to compare in value to human life and health.

The accomplishments of the Michigan State Board of Health are the result of 21 years of progress in sanitary work and experience.

During these years its labors have been enriched by the investigations and knowledge of such men as Dr. Lyster, Dr. Kellogg, Prof. Kedzie, Prof. Vaughan and many others whose names adorn the records of science on two continents.

It is these who have given to Michigan's State Board of Health a name and a prominence which every one of her children may contemplate with pride.

Will the present Michigan Legislature thoughtlessly destroy this creation of years in the midst of its activity, and usefulness? Does the physician whose practice it has diminished, the man of science who is its teacher, or the citizen who is its beneficiary demand such action? If these do not demand it, who does?

We confidently believe that the Legislative power of our State will not be used to destroy or even to restrict the value of the lines of work already in progress and those in contemplation as the Bill under consideration seems likely to do should it become a law, but that they will, by a generous support of these lines, sustain by their action the efforts of the Michigan State Board of Health which has accomplished so much in the past and which believes that still greater success will reward its efforts in the future.

After Mr. Wells concluded his address, he was asked several questions by various members of the Committee. Doctor Richardson asked why it would not be better for the members of the Board to act as communicable-disease inspectors. Mr. Wells explained that members of the Board or other physicians could not be expected to do the special expert work unless they had been especially trained; that physicians were not necessarily sanitarians; and that it would be much better to have such work done by an expert who should go out from the office as an employe.

Secretary Henry B. Baker, was then requesed to place before the Committee his reasons why the Bill should not become a law, and he did so by reading the following address:—

Relative to Mr. Miller's House Bill, "File No. 121," to provide for the Appointment of a Commission, and to repeal the act establishing the State Board of Health.

[Address to the Public Health Committee of the House of Representatives by Henry B. Baker, M. D., Secretary of State Board of Health.]

Considering first the main purposes of the Bill: It is very apparent that the main purposes are to abolish the present Board, and to create a new one. What can be gained, what is likely to be lost?

The present law was the result of study and conferences among the leading scientific and business minds of this State; and before its passage the bill was being thus studied and amended during more than three years. The law has been considered so good and so perfect that a large proportion of the States in the Union have copied largely from the Michigan law. The Miller bill has been hastily drawn; it is crude, imperfect, and in places uncertain.

The great main principles throughout the present law are the collection, and the spreading throughout the State, of facts useful for the restriction of communicable diseases, and for the prevention of sickness and deaths from all diseases. The Miller Bill does not make proper and unmistakable provision for these very important lines of work. This is true not only throughout the Bill, but special sources of information now provided for by law are repealed and done away with by the Miller Bill. For instance, under the present law (Sec. 8, Act 81, laws of 1873, to be repealed by the Miller Bill) the local health officers and clerks are required to report to the State Board of Health annually on blanks and in accordance with the instructions of the State Board, and to make

special reports whenever required. One of the results of this is the building up of a system of contagious-disease statistics, which is extremely valuable. The careful compilation of the facts in these annual and special reports have put the Michigan Board in possession of facts of very great importance, and which have been instrumental in saving many lives. The diagram on diphtheria in the five years 1886-90, for instance, exhibits some of the results of the compilation of such facts. (Explained the evidence in that diagram.) It is because of the possession of such facts as these that the Michigan State Board of Health has been able to keep in the front rank of such Boards, and is today acknowledged by those engaged in similar work and competent to judge to be the leading State Board of Health in this country. And not only in this country but abroad. At the last International Congress of Hygiene, at Budapesth, these contagious-disease statistics, particularly those relating to diphtheria, were presented by special request of Dr. Billings of the Surgeon-General's Office in Washington, he being the chairman of the Committee for the Congress, for the United States. It is by the collection of such facts, and their careful compilation by competent clerks, that the Michigan Board has been teaching the people the exact truth about the communicability of diphtheria, and has thereby been the means of saving hundreds of lives in this State. It is estimated that at least one life a day is being saved in Michigan from diphtheria by means inaugurated by the State Board of Health. And that work was commenced much earlier in Michigan than anywhere else because the Michigan Board first had the facts warranting such action.

The Miller Bill makes no provision requiring such reports to be made to the State Board of Health. And if the reports were to be made they could not be compiled, because of the reduction in the number of the clerks.

Again, the State Board of Health needs to study the causes of diseases which cause most sickness or deaths other than those known to be contagious. And it needs to know the times of least and of greatest danger from the contagious diseases, and what conditions cause an increase and what a decrease in such diseases. Under the present law a system of sickness statistics more complete and far more valuable than was ever established in any State or Country, has been built up in Michigan. By means of that system, more has been accurately learned concerning the causes of sickness, and of deaths, by the varying conditions surrounding the people, than has been learned hitherto by the whole civilized world. In the Miller Bill there is absolutely no provision whatever for continuing that work. In the Miller Bill the clerks are to be restricted to four. One clerk is apparently to be lopped off by abolishing the Michigan System of Sickness Statistics. This would be a serious blow to the whole scientific world, because there is not, in this country or in any other country, such a scientific system of sickness statistics; and sickness statistics are of greater value than are mortality statistics in studying the causation of diseases, with a view to their prevention.

The weekly, monthly and quarterly bulletins, now issued by the Board, are not the most important parts of that system; they are only ephemeral. Even the Annual Reports of the Board do not in every year contain the most valuable results of these statistics. But, from time to time, the statistics for a long series of years, on some important group of diseases are compiled and used in demonstrating the cause of an important disease.

This has been done relative to typhoid fever, relative to pneumonia, and several other diseases. Here is a diagram exhibiting some important facts relative to typhoid fever; the facts as to the water in wells has been learned through the compilation of reports of special observers for the State Board of Health; but those facts, of themselves, could not be used, except in connection with the sickness statistics, which, by the Miller Bill, would have to be discontinued. The facts gathered from both sources, and combined as they are, prove that there is an important relation of typhoid fever to the well water in Michigan, and supply information which is important for the State Board of Health, and for local boards throughout this State, to have and to act upon in their efforts to restrict this preventable disease, which still destroys annually about one thousand persons in Michigan.

I do not take your time to mention more than a single example of the nature of the prospective loss through each class of statistics which it is proposed by the Miller Bill to be discontinued, but I wish it understood that the instances that I have mentioned are simply illustrations of the many which I do not mention.

The proposed reduction in the clerks is to be accomplished by doing away with the extremely valuable work on which they are employed, work which, in my opinion, is of more importance to the welfare of the people of Michigan than most of the work done for the State. What work is there of more importance to the people of Michigan than the systematic collection, compilation and use of facts for the more complete restriction and prevention of dangerous diseases? The answer to this question is plainer when it is known, as is the fact, that the leading diseases which cause most deaths in Michigan are preventable diseases. Instead of lessening the efficiency of the State Board of Health by requiring a cheaper Secretary and less clerks, as the Bill does, its efficiency should be increased in every practicable way. How this may be done, and how as the present Board believes, thousands of lives may be saved and thousands of dollars in money values saved to the State, the present State Board of Health have very carefully considered, and have prepared bills on a number of subjects. Some of these important bills have been waiting legislative action for years, there being usually before each legislature some one who is dissatisfied with the State Board of Health, some times it is a great money interest like the Standard oil company, which would like less regulation of the use of dangerous oils, sometimes it is the agent of some patent system of ventilation, this session it is an ex-employee of the Office who has threatened the destruction of the Board. Every such interference with the work of the State Board of Health means loss of life to some of the inhabitants of Michigan. There can no longer be a doubt that the every-day work of the Office tends directly to save lives,—from diphtheria and from scarlet fever. Every day the mail brings notices of new outbreaks of those diseases. Every day the mail takes out from the Office something which aids local health officers to restrict those diseases. Conservative estimates place the saving of lives in Michigan by these means as at least three lives per day or eleven hundred per year, from three diseases alone—small-pox, scarlet fever and diphtheria. And these are not all the diseases the Office of the Board is dealing with every day in the year. The Board would be glad to do more in this same direction; and it could easily do more, and, therefore, save more lives, *if* it had the money necessary to the increased

work. It is hampered by lack of means. Its appropriations aggregate only six thousand dollars per year, while in Massachusetts, appropriations for work similar to that in this State aggregate over sixty thousand dollars—more than ten times as much as in Michigan. I believe the scientific work in Massachusetts is excellent, but I believe the Michigan work of far more practical use to the people—that is to say we absolutely know that in Michigan lives are being saved, and that the people are saving thereby what is of far more value than the twenty thousand dollars per year which it costs the State to pay the appropriations for the Board, the clerks, the printing, and all expenses incident to the work of the State Board of Health. A very simple computation will indicate this. Suppose we estimate that each of the eleven hundred lives saved each year is worth for what it will earn in excess of the cost of its maintenance, five hundred dollars. (Before the late war an average slave was worth more than that.) Then, multiplying five hundred by eleven hundred, we find ($550,000)—over half a million dollars saved for the twenty-thousand dollars outlay. In ordinary business, that would be considered not a bad investment. For the State it is an excellent investment—from a humanitarian, as well as from the mercenary view which I have just suggested.

I argue against any interruption or narrowing of this great work, and I most earnestly plead for such a broadening of it as will deal more completely with other diseases than the three from which the great saving just mentioned has been made. I refer especially to consumption, which causes more deaths than any other disease, and from which I believe more lives can be saved than from any other disease.

Such attacks upon the State Board of Health as this in the Miller Bill, are exceedingly discouraging to the Honorable Gentlemen who give their services to the State in this philanthropic work. Excepting the Secretary, no member receives a cent for his time or his labor, directly or indirectly. The State has been fortunate in the men who have been selected by the Governor and Senate to serve on this important Board. And it has been thus fortunate partly because of the wise law which this Miller Bill proposes to repeal and change. In the present law there is no chance whatever for any "job," nor any way whereby the honor of the position is lowered; the law says distinctly that the members shall *have no compensation*. In the Miller Bill there is provision for ten dollars a day to each member for work in his district, to "one or more members" at a time. My observation of the working of a similar law has proved to me that men have been put into such a position who succeeded in finding a way to obtain hundreds, perhaps more than a thousand dollars each a year. This is not an economical way to provide for such service. It is not a good way either, because members of the State Board of Health should not be selected with reference to their abilities as contagious-disease inspectors, but for abilities in a much broader field. Such State health work requires a comprehensive knowledge of sociology, as well as of many lines of sanitary science. But my greatest objection to that part of the Miller Bill is, that by providing opportunity for "jobs" it is likely to make it more difficult to obtain such high-minded philanthropical gentlemen as those who have heretofore accepted service on the State Board of Health, and much easier to get on the Board men who are looking for the money there will be in it.

a few of the many serious objections to the Miller Bill have been ith by me: I should like to continue, except that I fear I may you; and enough have been mentioned to utterly condemn it as hy of serious consideration. If it is desired to get rid of the t Secretary and members, I trust that the great work itself will so completely sacrificed as it would be by the Miller Bill. No has been made against any member or officer. It is certainly well hat the Governor would make quick work with any State official as proved guilty of any misconduct.

pectfully submit that the immense interests involved in this sub- arrant the most speedy action possible on this Bill; because it in the way of proposed public-health legislation, of incalculable ance. I estimate that the *money* losses in Michigan because of ption, much of which ought to be prevented, amount to more ree millions of dollars every year. Three thousand lives are thus Three thousand new cases of consumption are permitted to be con- here every year. If this Board is to be abolished, it should be t once in order that the important work which it is doing may be ise provided for. But, I trust that your committee will promptly this Bill with the recommendation that it do *not* pass.

HENRY B. BAKER.

he conclusion of Secretary Baker's remarks, the Committee asked entative Miller to explain the features of his Bill. Mr. Miller n attempt to explain the Bill, but immediately exhibited the fact e was not familiar with "his Bill." He became confused, com- l that "his side" was not present, and requested to bring in other s, which request was granted him by the Committee. He went and ed to ex-clerk Gongwer, who had been in waiting in a convenient Immediately Mr. Gongwer appeared and on invitation occupied tention of the Committee for over an hour with a disconnected against the members and Secretary of the State Board of Health.* unately there was no stenographer present to place all of Mr. er's assertions on paper, but notes on some of the statements and plies were taken, and the next day written out, and are as fol-

ents *prepared by Secretary Baker in reply to charges made by A. C. Gongwer and Representative Miller.*

recent hearing of the Miller Bill before the House Public Health ittee, Mr. Gongwer and Mr. Miller made the statement that the

Mr. Gongwer concluded his remarks it was within a few minutes of noon, and the Committee ermit the Secretary to reply to the statements in detail, but agreed that there should be another ne week from that day, Thursday, March 14, when the Secretary could reply to the accusations he ex-clerk; but that opportunity was never given the Secretary or any other representative of . As the Chairman of the Committee said, he had made up his mind, and did not wish to hear arguments. March 26 it was rumored that the Committee would report the Bill out and recom- t it pass the House. Even when that information reached the Secretary, he sent word to Chair- is requesting that he be given an opportunity to reply to the half-truths and misstatements, hairman replied that there would be no further hearing, and at that moment he and the author l were getting it ready to report back to the House. On March 27 Chairman Harris reported the the recommendation that it pass. The Bill was placed on the general order to be discussed in nittee of the whole.

he best information the Secretary could receive from members of the House Public Health e and others, it seemed that the Chairman of the Public Health Committee and one other mem- ommittee of five made a report which purported to be a majority report; the three other mem- ed to be much surprised when asked what they knew about the action of the chairman and one nber of the committee.

greater share of the appropriations made for the Massachusetts State Board of Health were made for special purposes not dealt with by the Michigan State Board; for instance, for Food and Drug Inspection $11,500; and for the protection of the Purity of the Inland Waters $27,000. It was alleged that these appropriations should not be compared with the appropriations for the Michigan Board, because the Michigan Board had never done any work in those special lines.

The Secretary of the Michigan Board replied to Mr. Gongwer that such work had been done and was being done by the Michigan Board, and what is more such work relative to foods, drugs, and water-supply is provided for in the law establishing the Board (Act 81, laws of 1873). The Secretary said that recently there was hardly a quarterly proceedings of a meeting of the Board but what there was in it mention of one or more instances of such special investigations into some article of food, drug, or water-supply. The following is a list which will show some of the work done by the Michigan Board in the special lines above mentioned:—

Impurities and Adulterations of Table Syrups, by Prof. Kedzie. (In the Annual Report of the Board for 1874.)

The Use of Poisons in Agriculture, by Dr. Kedzie; Trichinæ, by Dr. Hazlewood. (Annual Report for 1875.)

Water, and Water-Supply in Michigan, by Dr. Hazlewood. Also "The Water-Supply in its Relations to Health and Disease, in some of the townships, cities and villages in Michigan, being replies of regular Correspondents of the Board." (Report of the Board for 1876.)

Labelling Medicines, by Dr. Kedzie; Remarks on Infant Diet, by Dr. Hazlewood, giving the composition of different kinds of milk, and the relation of milk from tuberculous cows to tuberculosis in children. The Relation between Cancerous Diseases and the use of Tomatoes as Food, by Dr. H. O. Hitchcock. (Annual Report of this Board for 1878.)

Additional Work on Water Supplies of Townships, Cities and Villages, was continued. (Report of the State Board for 1891.)

Meats, by Prof. Vaughan. (Report of the Board for 1882.)

Poisonous cheese, by Dr. Vaughan. (Report of Board for 1885.)

The First Quarterly Report of the Michigan State Laboratory of Hygiene. (Report for 1887.)

Adulterations Found in Common Food. (Report for 1885.)

Water-Supply, by Dr. Vaughan. (Report for 1885.)

The Chemistry of Tyrotoxicon, by Dr. Vaughan. (Report for 1887.)

Model Diet Tables, by Dr. Vaughan. (Report for 1889.)

The Water-Supply of Cities, by Dr. Vaughan. (Report for 1890.)

On page 39 of the Annual Report for 1884 will be found the report of an examination of the Water from Adrian, made by Prof. Vaughan, and one made by Dr. J. E. Clark.

Tyrotoxicon; its presence in poisonous ice cream, its development in milk, and its probable relation to Cholera Infantum and kindred Diseases. Also the report of the special committee of the Board to investigate the Water-Supply of Negaunee. (Report for 1886.)

Exposure of the Stenocarpine Fraud, by Dr. Novy; Vaughan's work on Tyrotoxicon and Cholera Infantum; Work by Drs. Vaughan and Novy in Examining the Samples of Water from Iron Mountain; four cases of Poisoning from Tyrotoxicon, with three fatal cases, investigations as to the origin of the poison, results of the Autopsy and Chemical Analysis, by Doctor Vaughan. (Report of the Board for 1887.)

Examination of Samples of Water from East Saginaw, by Dr. Vaughan. (Report of this Board for 1888.)

Examination of Cheese which caused many cases of Poisoning at Monroe, by Dr. Kedzie; Examination of Well-Water from Mendon, by Dr. Vaughan; Tyrotoxicon in Oysters, examination by Dr. Kellogg. (Report for 1889.)

Analysis of "Flander's Diffusible Tonic," by Prof. A. B. Stevens. (Report for 1890.)

Examination of samples of Milk, River Water and Well-Water, suspected of having been the cause of Typhoid Fever, near Wyandotte; Outline of the Work of the Michigan Laboratory of Hygiene, examinations of Baking Powder, examinations of samples of Drinking Water, etc. (Report for 1891.)

ination of Canned Currants, supposed to have caused poisoning in a family at Lapeer, by Dr. n; Investigation of Water-Supply at Baraga; Examination of Coffee supposed to have caused ng at Bay City, by Dr. Vaughan; Examination of Samples of Water from Iron Mountain. (Report State Board for 1892.)

g the last quarter of 1894, samples of the water-supplies of Marine City were investigated at the of the State Board of Health.

g the first quarter of 1895 Doctor Vaughan was directed to examine samples of antitoxine offered in Michigan, and I understand that the work is in progress. At the Jan., 1895, meeting of the Doctor Vaughan reported on the results of analyses of articles of food in cases of suspected poison- ne case was suspected poisoning by dried beef at Somerset Center, another case was suspected ng of some 200 persons at Sturgis, by an article of food.

ny more instances might be mentioned. They are numerous; and ially numerous considering the very limited appropriation of this d. For a number of sessions this Board has had before the Legisla- proposed bills asking for a small appropriation for the examination spected water, milk, food, etc., and to otherwise increase the ency of the State Board of Health. Such an appropriation is ed, because there is hardly a week passes without having at least one cation for the State Board to examine suspected water, milk, or article of food. In Mass. the appropriation for inspections of foods drugs is $11,500; and for inland waters $27,000. For 1893, the . State Board had an appropriation of $15,000 for investigation of Water-Supply of Boston, and suburban towns. In Michigan, the Board can use in such work only a portion of its two small appro- ions, the regular one being only $4,000, and the special one only two sand dollars per year, yet the work done in Michigan in those lines own around the world. I refer especially to the analyses of foods h resulted in a knowledge of tyrotoxicon.

r. Gongwer charged that the Secretary of the State Board of Health been guilty of permitting packages on which postage was not prepaid main for a time in the post-office. That *was* formerly a custom, at ime of year when the annual reports of health officers and clerks coming in. Less time was then required to keep the expense unt for postage, and the reports might collect at the post-office for a days just as well as in the office of the Board, because it was impra- le to compile the reports until they were all in. However, that m was changed, because it was found that *sometimes* an annual rt contained information of there being a dangerous disease at the the report was made not otherwise reported as it should have been r the law. It was Mr. Gongwer's business to act at once on every instance of new information of a "disease dangerous to the public h." One of the things which led up to Mr. Gongwer's leaving the e, was his refusal to thus act with reference to consumption. enced by the President of the Board, he reconsidered his refusal, gave the Secretary to understand that he would comply. But since Gongwer left the Office, many reports containing such *new* informa- of the presence of this most dangerous disease with which the Board o deal, have been found on Mr. Gongwer's table, which he had per- d to accumulate there, he having not taken the prompt action ired by the Rules of the Office. Such reports of consumption at *68* s were found on his table, entirely neglected by him. He claimed he was overworked; but another clerk who had not had the experi- which Mr. Gongwer had, immediately took his place, and has not

only kept up the daily work, and the numerous annual reports which are now coming in; but has acted on all of the large collection of reports of consumption left neglected by Mr. Gongwer, and has helped on other work of the office.

Mr. Gongwer charged that a housewife had been employed at the table next to his and was given the same salary. It is admitted that a woman clerk was and is thus employed. She compiles the contagious-disease statistics. Mr. Gongwer was for a short time doing similar work, but his temper and temperament did not fit him for that, and he was put at other work. One of the requirements for the compilation of such statistics, is absolute and unvarying honesty, as well as ability to judge correctly, and painstaking care in bringing together all the facts from the several "outbreaks," "weekly," "annual," and "final" reports, and from the letters on each outbreak. The woman clerk was found to do satisfactory work on that subject and received the same salary as did the man who had been found to be better fitted for other work than for compiling contagious-disease statistics. Under the Miller Bill which Mr. Gongwer advocated before the Committee there could not be any such statistics, because the Bill repeals the only law requiring such reports. And the clerks are to be reduced so that the services of the "housewife" would undoubtedly be dispensed with. But those statistics are of very great practical use for teaching boards of health, and the people generally, the truth about contagious diseases, and how they can be done away with; and, thus far, the most scrupulous care has been taken to make them absolutely reliable in every particular.

Mr. Gongwer claims that his experience in compiling those statistics enabled him to make the assertion that those statistics were unreliable. In proof, he said there were instances where outbreaks occur near the corners of four townships. Manifestly, if such an outbreak is divided into four outbreaks as it is necessary to do in compiling by jurisdictions, there may be only one-fourth as many cases and deaths in each "outbreak" as there would if the same outbreak occurred in the middle of one of the townships. He left the subject there, either because he honestly believed that the statistics are thus made unreliable, or because he thought to delude, or "throw dust in the eyes" of the committee. I give him credit, in this instance, for honesty of belief; but if so, it is only another evidence of his entire unfitness for statistical work; because any bright school boy should know that for the purpose for which "outbreaks" are compared in the statistics which he was criticising, the instances mentioned by Mr. Gongwer would influence both of the statements compared in the *same proportion*, and so is equivalent to equal cancellation, leaving the two statements to be compared in the same relation to each other.

But, even if such instances as Mr. Gongwer referred to did occasionally interfere with the results, as soon as the outbreaks compiled are sufficiently numerous, all such accidental disturbances would disappear, according to the "law of averages," well known to statisticians, but probably not undersood by Mr. Gongwer, who while in the Office was never considered an expert statistician. In the statistics he criticized, it is now certain that such accidental disturbances have been thus eliminated each year, because the statistics compiled in each of the several years substantially agree—one year with another—and each year gives approximately the same results as the average for a number of years, so that it is apparent that the truth is approached.

Meteorological Data. Sickness Statistics.

Mr. Gongwer claimed that the maintenance of a corps of meteorological ervers was an unnecessary and expensive duplication of work done by U. S. Weather Bureau. There is *no* considerable expense for obtain- meteorological data from the Board's observers more than from the ather Bureau, for the reason *that the Board's observers have no com- sation*, they do the work for nothing, from philanthropic motives ply for the advancement of science. They would be relieved from work if the data supplied by the Weather Bureau were as useful as data supplied by the Board's observers, but they are not. As the enter can judge whether material supplied to him is useful for his poses, so the statistician can tell whether or not material supplied to is useful for his purposes. (If any person wants the details of the ons why the U. S. Meteorological Observations are *not* available for ent use in connection with sickness statistics in Michigan, he can e the facts from the Office of the Secretary of the Board. It might ry you to give the details here now.)

Mr. Gongwer asserted that the comparisons of sickness statistics with ncident meteorological conditions so elaborately worked out through series of years by Dr. Baker, were simply the "thrashing over of straw," that similar work has been done years ago, and that the books taining the results are in the Office of the Board. The correct answer his is, that the idea thus conveyed by Mr. Gongwer is absolutely rue. There are statistics of deaths, and of meteorology, and there are ements of the relations of the two, extending back to the time of pocrates, but there are not now, and there never have been any sick- statistics approaching anywhere near the extent of territory, the th of time, or the value, of the sickness statistics of Michigan. In sachusetts similar statistics were collected for a single year. Sick- statistics are collected in the Armies and Navies of most countries. they do not supply data for studying the sickness of people of all , and of both sexes, over one entire State. Mortality statistics are ected in many countries, and the results of them have been studied by Baker, but statistics of *deaths* do not go back so near the causes of ases as do the statistics of *sickness* which are therefore more valuable. y are indeed indispensable for studying the causes of diseases. Even ere had been sickness statistics in other States and Countries, there ld still be need for them in Michigan, because the conditions in higan may differ from those in other States. These sickness statis- of Michigan, and their collaboration with the meteorology of Michi- establishing, as they have, such relations as that of the sickness typhoid fever to low water in wells, supply information which the le of Michigan do well to heed. Many localities have heeded the hing of such facts, and the lessening of typhoid fever is one of the lts of that work. (See diagrams "Low Water," etc., and "Lives d.") But we have reason to believe that the use of information ed through such researches has not fairly commenced. Many rela- s of diseases to conditions have been found which cannot yet be ained and acted upon. It is reasonable to believe that continued will reveal the missing links in the evidence, and make such knowl- useful for preventing disease.

Mr. Gongwer complained to the Committee that he was not promoted as he should have been, and a member of the Committee asked the Secretary why the clerks are not promoted to be Secretary? And why the Secretary should not retire from that position, after occupying it for a few years, in order to stimulate effort by the clerks. The Miller Bill fixes the term of Office of the Secretary at two years.

The position of Secretary might be used as a "job" to be given to the clerks in turn, thus graduating one every two years. But is it not too much, to sacrifice the head of the Office in order to get better clerks? Experience has proved that clerks can be secured without any such displacement of a Secretary, before he has had time to learn the business. No person can in two years master the work of Secretary of a Board of Health for a great State like Michigan. And working hard every day on one branch of office work will not in ten years, nor ever, of itself fit a clerk for the work of Secretary.

Whoever, as Secretary of the Board, replies by letter, by telephone, and by telegraph, to the questions as to the public-health laws, which are daily asked by some of the four or five thousand officers of local boards of health in Michigan, must have a very complete knowledge of all such laws in Michigan. A clerk may do good work compiling contagious diseases, without gaining much knowledge of State laws. Many of the officers of local boards are changing every year. Each new officer needs instruction, not only in public-health law, but in several branches of sanitary science and public-health administration.

Whoever, as Secretary, replies to the daily questions from officers and citizens as to the best sanitary measures under the circumstances mentioned, must be well prepared with the latest knowledge in sanitary science. A clerk may compile meteorological data for years without gaining complete mastery of sanitary science. A Secretary must keep up with the progress of the several sciences of climatology, vital statistics, bacteriology, toxicology, and antitoxines, chemistry, water analysis, and the medical branches such as the incubation periods of contagious diseases, signs and symptoms of each; and other subjects too numerous to mention. It is utterly absurd to suppose, for a moment, that work as a clerk in an office will, of itself, fit a person for a service requiring not only professional medical training, but also training in several allied sciences. And few physicians having thorough training in many sciences are employed as clerks in State offices. No part of this Bill ought to become a law, but relative to this part of the Bill, I would suggest that another Bill should provide for an assistant secretary who, before his appointment, shall have training in some of the sciences, and who might gain some knowledge of public-health law, and training in statistics, etc., by actual work in this Office. The present Secretary may not be able to serve the State for many years longer; he has already served over twenty-one years. Prudence dictates that preparation should be made for such a successor, that there may not be too great a break in too many lines of the work. Mr. Gongwer's greatest regret seemed to be that he could not get the present Secretary removed in any other way, hence the necessity for this attempt to legislate him out of Office. But the present law provides for removing the Secretary at any regular meeting of the Board; all that is required is that there shall be a cause. Mr. Gongwer claimed that he had complained to the President of the Board, and failed to con-

vince the President that there is a cause. Therefore it is necessary to legislate the Board out of Office, in order to enforce Mr. Gongwer's wishes.

Mr. Miller charged the Secretary with falsifying by stating that "this session it is an ex-employee of the Office who has threatened the destruction of the Board." Mr. Miller called upon Mr. Gongwer (the ex-employee) to testify to the truth of Mr. Miller's charge. In responding before the Committee, Mr. Gongwer said Mr. Miller had in mind the introduction of a similar Bill two years ago, but did not, because Mr. Gongwer, an army comrade of his own regiment, might lose his position if the Bill passed. This year, as soon as Mr. Gongwer was out of the Office, Mr. Miller introduced the Bill.

Thus it appears that if Mr. Gongwer had not lost his place, the Bill would not have been introduced. That was as it has been supposed. Mr. Miller's witness left no doubt as to the reason for this Bill. But the statement by the Secretary was based upon positive knowledge. Mr. Gongwer made the threats before he left the Office, when he left the Office, and the Secretary of the Board has heard of them since he left the Office; and that he is doing his utmost to accomplish the threat is well known, as is evidenced by his making the main plea in favor of the Miller Bill before the House Committee on public health, and by his very frequent presence in the legislative halls, near Mr. Miller's seat.

Mr. Gongwer is, apparently, bitter against the Office in which he is no longer employed. His attack is a frenzied one against every line of work. His object is to accomplish the threat which he made before he left, when he left, and which he has mentioned as a condition in case he was not re-instated. As he is apparently constantly employed in trying to carry out his threat, so one who replies to all his talk would need to be constantly employed. As it is not possible for the Secretary of the Board to be thus employed, he takes this occasion to say and affirm that during the twenty-one years existence of the Board, there has never been an instance of any wrong action by the Board or by any officer of the Board; there has never been any extravagance. How could there be serious extravagance when the only appropriation ever had for *general* purposes is the one of four thousand dollars per year, out of which must also be paid the salary of the Secretary, and the expenses of members of the Board. The only other appropriation is the one for two thousand dollars, which must be used "to purchase meteorological and other instruments, make special investigations, pay official expenses of members, and other expenses in attending and holding sanitary conventions in different parts of the State, and cause to be made and distributed documents in pamphlet form, and reprints of such articles in its annual report as the Board may deem it for the best interests of the public health to distribute about the State."

Mr. Miller claims that the expenditures by and on account of the existence of the State Board of Health aggregate twenty thousand dollars per year. This, I believe, is about the amount for the year in which they have been greatest, and including the expenses incurred in enforcing the State law for keeping out cholera and other dangerous diseases, by means of a State quarantine against immigrants at the State line. But there are good reasons for the belief that through measures adopted and continued by the State Board of Health, there are being saved in Michigan about three lives per day, or eleven hundred per year, from the three diseases—diphtheria, small-pox, and scarlet fever, and that through that

saving there is also saved to the people of Michigan at least half a million of dollars per year in money values. I do not know of any other State expenditure which yields so valuable returns.

The guarding and the saving of the lives and health of the people of Michigan, is the highest interest that the people of Michigan have entrusted to the legislature; yet the appropriations for such purposes have always been insignificant, compared with those for the maintenance of special classes of the people such as the insane, the deaf, the blind, and the other classes of defective inhabitants. It is a fact, and should be well known, that many of these are "defectives" because of preventable diseases, such as scarlet fever, diphtheria, etc., and a true economy would put more money rather than less, into the lessening of the various defectives in Michigan, through the restriction and prevention of diseases.

The greatest cause of poverty, and of the filling of poorhouses, in Michigan, is sickness and mortality, and among the greatest of these causes is that disease of which the State Board has lately undertaken the restriction, namely tuberculosis, commonly known as consumption. If, as the State Board of Health believes this can be lessened, there is opportunity for saving to the people of Michigan at least three millions of dollars per year. Considering not only the money values, but also the human anguish which is involved in the premature loss of about three thousand persons per year, and which the State Board of Health thinks is in great part preventable, is it not worth while to let the State Board of Health have a few thousand dollars to try and accomplish what that Board, of philanthropic persons especially set apart for that work by the Governor and Senate of this State, have unanimously decided to be a practical plan for the accomplishment of such a grand and glorious purpose?

If the five or six thousand dollars additional appropriations provided for in House Bill File 99*, House Bill No. 571† and House Bill 739‡, asked for by the State Board of Health be not granted, what answer will the legislators give to the thousands of people in this State who are watching the outcome?

If the additional appropriations are not granted, and the great work is broken into, by the passage of such a bill as the Miller Bill "File No. 121," what great reason can be stated which will be commensurate with the immense interests involved in the uninterrupted action of an effective State Health Service?

The present law establishing the State Board of Health is a singularly perfect one, and has served as a model for many other States. Under it the Michigan Board has been able to do work which has placed Michigan in the front rank in sanitary affairs. The Miller Bill is hastily and imperfectly drawn, on principles which the members of the present Board believe to be wrong. For the members who now serve without compensation, it seeks to substitute those selected as Contagious-Disease Inspectors, six of whom are to have ten dollars a day each when so employed. This might open the way for greatly increased expenditures. The Miller Bill, by limiting the clerks, abolishes that part of the work heretofore done. Why should the clerks in the State Health Office be

* "A Bill to provide for the auditing and paying of Bills for expenditures for the Office of the Secretary of the State Board of Health."

† "A Bill to amend section one of Act No. 241 of the public acts of 1881." (This Bill provides for two thousand dollars additional appropriation per year for Sanitary Conventions and other purposes.)

‡ "A Bill to provide for the employment by the State Board of Health of one or more Communicable-Disease Inspectors." Appropriates $3,000 annually.

limited, any more than those in the Office of the Supt. of Public Instruction, or any State Department?

Reply to charges relative to a Sanitary Periodical.

The fact that a Sanitary periodical journal had been sent to physicians in Michigan, by order of the State Board of Health, was distorted, and an effort made to make the fact damage the reputation of the Secretary of the Board. The following statement of the facts was prepared.

The law makes it the duty of the State Board of Health to "make sanitary investigations and inquiries respecting the *causes of disease.*" In order to do this, it is *necessary* to learn *what diseases* prevail in different parts of the State, and *when* they prevail. Hence the Board supplies postage and necessary supplies, record-books and blank reports, to physicians throughout the State, who make such reports. At first, these were all leading physicians who were willing to do this work for nothing simply through the philanthropical spirit common to physicians. Later it became desirable to have a greater number, and the reports of sickness were asked for under the law providing for special reports from city and village health officers. Inasmuch as local boards did not usually allow health officers compensation for making such reports, and the reports were of value to the State, recognition of the gratuitous service of those who regularly made such reports seemed important, in order to continue the investigations of the causes of disease, as required by law. The funds at the disposal of the Board were not sufficient to really pay for the labor, and the amount which could be sent to each one was so small that, if sent in money, it would look ridiculous as coming from a great State like Michigan; so a popular sanitary journal was sent to each one, as a token of recognition of his public service. Later, even this small token of recognition to reporters seemed to be more than the State could pay for, and it was discontinued. While it was done, it seemed to increase the number, regularity and value of the reports, and it seems too bad that there should not be some way to pay for services as valuable to the people as is an exact knowledge of the prevalence of each important disease, but under the present appropriation they cannot well be paid for.

Reply to charges relative to expenditures by and on account of the State Board of Health.

Exaggerated statements were made relative to the expenditures by and on account of the State Board of Health. A correct statement was prepared, as follows:—

The publication of the Annual Report of the State Board of Health is authorized by Section 262 Howell's Statutes Supplement. For the year 1886, the Annual Report of the Board was *estimated* to have cost $2,708.24. According to the Report of Board State Auditors for 1893-94, the cost of the one printed in the fiscal year 1893-94 was $2,136.73. The Annual Reports for recent years do not differ very much, and the amount for 1893-94 is believed to be about the right amount for each recent year.

Under Act 230 laws of 1885, *as amended by Act 47, laws of 1893*, the State Board can, on approval of the Governor, use money for *State quarantine purposes* for the prevention of the introduction and spread of dangerous diseases, and for no other purpose. In the year 1894 the

amount paid was $1,011.00. (This includes $460.00 expense incurred in 1893.) Nearly all this entire amount was for the inspections and disinfections at the Canadian border during the prevalence of cholera in Europe.

EXPENDITURES BY, AND ON ACCOUNT OF THE STATE BOARD OF HEALTH, YEAR 1894.

Chemical Analyses	$50 00
Expenses of Members:—	
Attending meetings	63 20
Other Official	585 48
Instruments and Books	208 32
Paper, Stationery, etc.	209 44
Postage:—	
Office	1,210 00
Members	1 00
Printing and Binding	519 46
Secretary' salary	3,000 00
Miscellaneous	52 71
Expressage	52 26
Telegrams	18 00
Telephone	30 00
(The two appropriations, Calendar year 1894)	$5,999 87
The amount paid to clerks* in the Office, in 1894	11,236 56
The cost of Annual Report† in fiscal year 1893-94	2,136 73
Examination of plans for State Institutions,‡ etc.	139 47
For State Quarantine purposes§	1,011 00
Total expenditures by, and on account of State Board...	$20,523 63

Objections to the "Miller Bill" prepared by Secretary Baker for members of the House Committee on Public-Health and others interested in Public-Health Work.

House Bill File No. 121, (Miller Bill) is now before the House, having been favorably reported in this form by the Public Health Committee. Only two members of the Committee were present when it was acted upon. I understand that the other three members do not favor the Bill. The Bill came up Thursday and was informally passed. It may come up next Tuesday evening, or Wednesday.

The Miller Bill *abolishes the present non-partisan State Board of Health*, and provides for a partisan Board, or "Commission."

By the Miller Bill (File No. 121) the appointments are to be made by the Governor and Senate, as they have been heretofore. What, then, is the purpose of having new appointments? Evidently one purpose is to do away with a non-partisan Board and to make a partisan Board. Because no one would think of appointing a physician not of the political belief of the dominant party, to have control of one division of the State, when, as the Miller Bill provides, all the local boards within his district must "comply with all lawful instructions given by said member or members" of the State Board of Commissioners. And whenever the politics

* Under Sec. 339, Howell's Statutes.
† Under Sec. 26k, Howell's Statutes Supplement.
‡ Under Sec. 418, Howell's Statutes.
§ Under Act 47, laws of 1893.

of the Governor and legislature shall change, the entire membership of this political Commission must change, just as soon as a bill can be put through the legislature. Are not the public-health interests of the people too sacred to be thus interrupted by every partisan change?

Apparently one purpose of the Miller Bill is to displace the present Secretary of the State Board of Health. This is to satisfy a man who was a clerk in the office, but who has recently lost his place. It was that man who made the main plea for the Miller Bill, File No. 121, before the Health Committee. But every charge he made has been satisfactorily answered by the Secretary of the Board. Does this Legislature desire to aid a clerk who has been displaced for cause (refused to obey the regular rules of the office) to wreak vengeance on a State official against whom no offence can be proved?

The Commission provided for by the Miller Bill (House File No. 121) is very different from the present State Board of Health, in that the members are to be selected not as sanitarians but as physicians, and they are to be *paid* as contagious-disease inspectors, having control of a division of the State. This is an experiment, both as regards the inspection feature, and also as to whether there shall be any utility in a State Sanitary Commission composed of contagious-disease inspectors, instead of sanitarians such as have made the Michigan State Board of Health a good name known throughout this country and abroad.

As it now stands, the Miller Bill (File No. 121) makes it impossible for the proposed "Commission" to continue the Contagious-Disease Statistics, and makes it impossible to continue the Sickness Statistics.

There is no reduction of any expense for any purpose except *perhaps* for regular clerks at *some* times, but "in cases of emergency" there is to be no limit to the number of clerks.

In Section 3, there is what is equivalent to an appropriation not exceeding $18,000 per year, for the investigation of outbreaks and threatened outbreaks of disease. Although not more than $30.00, and expenses for hotels and traveling shall be paid for one investigation, the investigations are unlimited. Counting three hundred days per year at $10.00 per day, $3,000 per year might be used by each of the six members. The investigations could be much better done by an expert Communicable Disease Inspector who should go out from the office of the Board, as provided by House Bill No. 739, which has been referred to the Committee on Public Health, and is being held back by that Committee until the fate of the Miller Bill has been decided. That Bill provides for an appropriation not to exceed three thousand dollars to accomplish a better work than can be done under the Miller Bill which indirectly provides an appropriation not to exceed $18,000, *in addition to all present appropriations* for the present State Board, and besides the "necessary hotel and traveling expenses" for six members of the Commission to be created by the Miller Bill.

There is no question but that there should be aid by the State Board to localities in which, by reason of disputes relative to diagnosis, and for other reasons, the local board cannot stamp out a dangerous disease; but the Miller Bill, File No. 121, provides expensive methods, virtually appropriating not exceeding $18,000 per year besides hotel and traveling expenses for six members, while by the bill recommended by the State Board of Health (House Bill 739) only three thousand dollars is appropriated for the payment of inspectors, *including hotel and traveling*

expenses. And the inspector, as recommended by the State Board of Health, is to be an expert in bacteriology and in the diagnosis of the dangerous diseases. He is to be thoroughly familiar with the work of the office of the Board, and with the public-health laws, so that he can point out what needs to be done and how to do it in accordance with the State laws governing public-health affairs, in townships, cities and villages.

Eighteen or twenty thousand dollars per year for an experiment, such as is proposed by the Miller Bill, is an expensive experiment, especially as it is in a direction which the leading sanitarians in this State have declared is not a promising one. On the other hand, the $3,000 provided in House Bill 739 which the sanitarians recommend, is a very much smaller sum, and the method has already been tried, in a limited way, and found satisfactory.

INTRODUCTION AND CONSIDERATION OF THE "BIALY BILL" IN THE SENATE.

Feb. 19, a bill (Senate Bill No. 329, File No. 329) was introduced by Senator Bialy, of Bay Co., it being:

A Bill to amend sections 3, 4 and 5 of act No. 81 of the laws of 1873, entitled "An act to establish a State Board of Health, to provide for the appointment of a superintendent of vital statistics, and to assign certain duties to local boards of health, approved April 12, 1873."

The Bill was tabled on introduction, afterwards referred to *Senate Judiciary Committee*, (not Public Health Committee) reported favorably, passed the committee of the whole, and, May 9, passed the order of third reading with vote 17 to 9. The vote was as follows:—YEAS—Messrs. Barnum, Bialy, Chittenden, Clapp, Eaton, Jamison, Jewell, Keeler, Mason, Merriman, Pasco, Prescott, Shaw, Sheldon, Smith, Townsend, and Warner. NAYS—Barnard, Brundage, Earle, French, Gaige, Johnson, Kilpatrick, Martin and Preston.

In the House the Bill was referred to the Committee on State Affairs, where it was voted by the Committee to pigeon-hole it. Several attempts were made to force the Bill from the Committee, but to no avail. Late in the session, on motion of Mr. Aplin from Bay County, to order the Bill from the State-Affairs Committee, the House refused, the vote being 25 for and 30 against.

The Bill was apparently, a political measure, and would have placed the State Board of Health into politics. Its principal object was to make a two-year tenure of office for the Secretary, provided that he should not be a member of the Board, and that the Governor should be a member. The term of office of the Secretary would then expire at the time the Governor and his two recent appointees came on the Board, therefore the Secretary would be chosen every two years by a board three members of which might be entirely new to public-health work. Evidently the tendency would be to make the office a reward for political support to the incoming governor. The origin of the bill, the views of members of the State Board of Health, and a letter from Secretary Baker relative to a similar bill in the State of Maine, are to be found on pages xxxiii, xxxix–xl of this Report.

Final action on the "Miller Bill."

Representatives Chamberlain, from Gogebic, Covell from Grand Traverse, and Kelley from Muskegon, spoke for the Miller Bill, while those speaking against its passage were: Representatives Waite from Menominee, Smiley from Calhoun, Allen from Eaton, Edgar from Lenawee, Taylor from St. Clair, Rose from Ogemaw, Waldo from Wayne. The discussion lasted two hours, Representatives Chamberlain and Kelley were the most important speakers for the bill, their speeches being much the same as the one by Mr. Gongwer before the public-health committee.* The vote on third reading, was as follows:—

YEAS—Messrs. Belknap, Benoit, Bradbury, Brown, Camburn, Chamberlain, Clark, Cook, Cousins, Covell, Davis, Ferguson, Fisk, Flood, Harris, Henderson, Herrig, Holmes, Huggett, Jones, W. D. Kelley, Kempf, Kimmis, Kingsland, Kingsley, Lee, Lonsbury, Madill, Marsilje, Matthews, McNall, Morse, Norman, Parkinson, Pearson, Peer, Place, Redfern, Rice, Robinson, Rowley, Stoll, Wagar, Ware, Wildey, Wood and Woodruff.—47.

NAYS.—Allen, Amidon, Baird, J. T. Campbell, G. M. Curtis, Donovan, Edgar, Fitzgerald, Foote, Foster, Fuller, Graham, Henry, Hicks, Hilton, Holden, Hoyt, W. J. Kelley, Kent, Latimer, Linderman, Marsh, Miller†, Mulvey, Partridge, Perry, Rich, Robertson, Smiley, Taylor, Voorheis, Waite, Waldo, Westcott, Whitney, Wortley, and Speaker Gordon.—37.

On motion of Mr. Miller the House voted to reconsider the vote by which the bill failed to pass. The Bill was then laid on the table and the House adjourned.

Legislative Investigation asked for by the State Board of Health.

At the time of the third reading of the Bill charges were made recklessly, and statements were made on the floor of the House which were known to members of the State Board of Health to be outrageously untrue. The regular meeting of the State Board of Health occurred April 12, when the subject was discussed and action taken which resulted in sending to the House of Representatives the following:

STATE BOARD OF HEALTH,
Lansing, April 12, 1895.

To the Honorable the Speaker and House of Representatives:

At the annual meeting of the State Board of Health held at the Capitol, Lansing, April 12, the following was unanimously adopted:

WHEREAS, Serious charges have been made on the floor of the House of Representatives, reflecting on the business and professional character, as well as the integrity of the members of this board, therefore

Resolved, That this board respectfully and earnestly requests the honorable, the House of Representatives, to appoint a committee to investigate the above-mentioned charges, and that the committee be

*It was reported that Mr. Gongwer's manuscript was seen on the desk of one of these speakers at this time.

†Vote changed to "Nay" in order to move to reconsider.

authorized and directed to make a thorough investigation of all the acts of this Board.

FRANK WELLS,
President.
HENRY B. BAKER,
Secretary.

When the above communication was read to the House, the following resolution was presented by Hon. J. T. Campbell:—

Resolved, That a committee of three be appointed by the Speaker of this House to make a thorough investigation of all charges made upon the floor of the House against the State Board of Health, in pursuance of the written request of said Board.

The communication and resolution created some sensation, those in opposition to the Board made an effort to kill the resolution by laying it on the table; it was claimed that no member of the House could be held responsible for words spoken in the discussion of the Bill, and, as a last resort, they endeavored to delay action on the resolution until after the noon hour. After the recess there was another effort to postpone the consideration of the resolution. Notwithstanding the opposition, the resolution was adopted. Hon. J. T. Campbell requested that he be not appointed a member of the Committee. The Speaker announced Messrs. Cook, Amidon and Holden as the special committee to investigate the doings of the State Board of Health. A day or two later Representative Amidon declined to act, and Representative Edgar was appointed in his place.

May 1, the House of Representatives authorized this special committee to employ a stenographer to take the testimony. The Committee soon commenced the investigation; which, with many interruptions, continued until within a few days of the end of the session.

At first Chairman Cook, himself an attorney, conducted the examination on behalf of the committee, but it soon became very apparent that he was strongly prejudiced, and was acting as the attorney of the ex-clerks and others antagonistic to the Board; recognizing his anomalous position as attorney before himself acting as a judge of the case, he asked for and received the aid of the Assistant Attorney General, on behalf of the opponents of the Board. The Attorney General had been asked by the Secretary to act for the Board before the committee; but he had declined, alleging that the Secretary himself was best qualified to act. But the Secretary was not a lawyer, and about that time was taken sick, so that if he had been a lawyer he could not have been present to represent the Board. It became necessary that the Board should have a legal representative at the sessions of the committee. Accordingly, Hon. Schuyler S. Olds was employed to represent the Board. Later Mr. Olds found it impossible to give the subject the required attention, and Henry A. Haigh, (of the firm of Atkinson and Haigh) of Detroit, was employed to assist Mr. Olds. One of these attorneys was present at every session of the Committee, and there is no doubt but that the very favorable outcome of the investigation was due to these gentlemen whose legal ability enabled them to cause to be explained satisfactorily half-truths and misstatements which otherwise might have been permitted to go unchallenged. Then again these gentlemen were very useful in examining the witnesses against the Board, in ways showing the animus in each case.

It was very apparent throughout the investigation that the chairman was strongly prejudiced and unfair in his rulings and actions.

Of most of those who were active against the Board, the animus which prompted the opposition was quite apparent, they were, for instance, agents of or lobbyists for the Standard Oil Company, disgruntled physicians who had been prosecuted for violating public-health laws, discharged clerks, misinformed persons who had been beguiled to do things which they would not have done had they been correctly informed, the attorney of a large railroad in the Upper Peninsula that had been prosecuted by the board for violating the quarantine laws of the State.

Many long and tedious sessions were held, at which Hon. Frank Wells, president of this Board, was nearly always present; the secretary much of this time being confined to the house because of sickness. In all, some five or six hundred type-written pages of testimony were taken, which would be impracticable to reproduce here, but can be found on file in the office of the Secretary of the State Board of Health.

The first and apparently most interested witness against the Board was Mr. George E. Willitts who had just left the office for cause. He was present at nearly every session, and seemed to be directing the opposition, asking the witnesses many questions until he became so prominent that it seemed to be necessary for the committee to call on him to desist. It is believed, however, that he was employed by the chairman of the committee during nearly all the remainder of the session, and received his three dollars per day as a witness before the committee.

When the real cause for Mr. Willitts' animus against the secretary and the Board was shown to the committee, Mr. Willitts' testimony had very little effect on the majority of the committee. The testimony showed that Mr. Willitts was Sept. 17, 1892, appointed "acting secretary in the absence of the secretary," but from his violation of published rules of the office, and from the fact that he held back the work of the office, and that he was over-bearing, and insulting to the clerks, etc., he was asked Jan. 10, 1894, to resign his position, but was retained in the office as a clerk. For his displacement he was very bitter against Secretary Baker. Prior to Mr. Willitts' resignation it was known that he was circulating a petition, and in other ways working against the Board, and it was thought wise to demand his key to the main office. Accordingly the secretary did so, which was an expression of a lack of confidence, and Mr. Willitts immediately resigned. Mr. Willitts' record in the office for some time prior to his resignation, had been very poor, but each time he was called before the secretary or Board he promised to do better, and he was allowed to continue. He had been deposed from several positions in the office: *first*, from the position of time-keeper, because he did not charge himself with lost time and was inaccurate with the time of other clerks; *second*, from the position of correspondence clerk, because of his inability to do the work and his slowness and laziness; and *third*, from the position of "acting secretary in the absence of the Secretary" because of general dislike by the clerks, because of his inability to do the work, and because of his persistent absence from the office without leave and without handing an account of his time to the time-keeper, and for other violations of the rules of the office. An offer was made to impeach his testimony, before the committee; but the chairman declined to permit it; the chairman said his mind was already made up; but until his minority

report was made it was not absolutely certain, although it was apparent, *which way* his mind was made up.

Mr. A. C. Gongwer was the other clerk who left the office for cause; but after his failure to pass the "Miller Bill," his interest relaxed, and he removed to another part of the State. However, he was called back to testify before the Committee, but what he said seemed to have very little weight, and he was not retained long.

Representative Miller, author of the "Miller Bill," to abolish the Board, seemed to lose interest when Mr. Gongwer did, and especiallly when an attempt was made before the committee to connect him with the Standard Oil company, with whose lobbyist he was from time to time seen in conference.

The opposition secured the testimony of a few physicians of Lansing and vicinity and tried to show that the secretary of the Board had neglected his duty. An instance of this is Dr. Hyatt's testimony, that secretary Baker had refused to go with the Lansing Health Officer, to inspect the outbreak of diphtheria at the State Industrial School for Boys. The defense showed that there was no law which required the secretary to act as a communicable-disease inspector, and that it would be impossible for the secretary to act as such an inspector and at the same time act as secretary of the Board. It was also shown that the secretary was always ready to give advice, but that it was impossible for him as a rule to visit localities. Dr. Rush J. Shank of Lansing had a similar complaint regarding the outbreak of diphtheria at the Agricultural College; and Doctor Alton, of Portland, another regarding the outbreak of diphtheria at Portland, Michigan. He complained that Secretary Baker had not investigated and supplied to him facts which the law requires shall be reported to the Secretary of the State Board by the local health officer—which was Dr. Alton. When asked by the defense, Doctor Hyatt admitted that, although he had been urged, he had not always complied with the law regarding reports to the Office of the State Board of Health, but thought he had done as much as he was paid for.

Mr. E. C. Chapin, attorney for the Upper Peninsula railroad which had been prosecuted by the Board for violating the State Quarantine laws, complained that his road had been discriminated against during the quarantine maintained by the State Board of Health; he had been informed by the agent of the Canadian Pacific Railway Co., at Detroit, that they had no difficulty in Detroit in getting immigrants through. But it was publicly and well known and should have been known by Mr. Chapin that the State Board of Health had inspectors at Detroit who did not let immigrants pass except after compliance with the same rules which were attempted to be enforced at the "Soo" on the line of road for which Mr. Chapin was attorney. There certainly was no "discrimination" against his company. He had also been misinformed or he would not have testified that the Secretary "demanded" that his road should do as the Grand Trunk Railway had done, have the disinfection done at Quebec under the supervision of some person relied upon by the Michigan State Board of Health. The correspondence is preserved and shows that the Secretary passed on to the officials of other railroads the "suggestion" made by an official of the Grand Trunk railway, and acted on by that road, that they would prefer to employ such a person at Quebec, to disinfect, than to do the work at the Michigan border.

When asked if he questioned the motive of the Board, Mr. Chapin said he did not, that he had always thought well of Doctor Baker and the Board, but his road thought they had been discriminated against.

After a time, the secretary of the Board was able to come before the Committee, when he made the following general statement controverting charges made by the ex-clerks and others and repeated on the floor of the House of Representatives:—

"I wish under oath to place on record that to the best of my knowledge and belief, during the nearly twenty-two years' existence of the state board of health there has never been any misappropriation of any state fund by the board, by the secretary, nor by any officer or member of the state board of health. There has never been any extravagance by the board, nor by any member or officer of the board; there has never been any money paid out of the state treasury through any action of any officer or member of the board except in strict accordance with state law; that the secretary of the board has faithfully devoted to the work of that department as much time and thought as have the heads of other State departments, boards, commissions or bureaus; that the secretary of the board has not used the time of the clerks in work on papers for his own personal benefit; that the secretary of the board has not been guilty of plagiarism; that the secretary of the board has always been willing at all times when practicable to advise with officers of local boards of health, state officers, members of state boards, physicians and others, on any important subject relating to the public health; that no officer nor member of the State Board of Health has officially done a wrong act in intent or in fact; that the work has been well planned and successfully executed, as is evidenced by its remarkable success and by the fact that it has been and is being generally copied by other states, and very recently its system of sickness statistics has been adopted by the United States government; finally, that the work of the State Board of Health has been fruitful to a very marked degree in the saving of life and health to the people of the State of Michigan. I believe that the board and myself can, and I trust that opportunity will be given us, to disprove or satisfactorily explain every charge made."

After his first day before the committee, secretary Baker was able to attend the meetings of the committee a short time each day, and was able to cover nearly all the ground, and disprove or satisfactorily explain to at least two members of the committee the complaints and statements against the Board and the secretary.

Dr. J. H. Kellogg of Battle Creek, an ex-member of the board, who had served over twelve years, testified in response to questions by Mr. Haigh that he believed that the work of the State Board of Health had been of inestimable value to the people of this State in the prevention of sickness and the saving of human life. He thought that the present law organizing the board was about as perfect as it could be made. He did not think it could be improved by the amendments now contemplated in the measures pending before the legislature. He said that it was by all means better to have the secretary a member of the board as is the general custom in the various states, and that his term of office should not be limited to any specific time. He emphatically denied the several vague charges of incompetency and lack of utility that had been made against the board. He said that the work of the board of health must necessarily be largely advisory, and that the executive work could only be done by

the local health officials in whom the law has reposed the adequate authority.

Dr. Victor C. Vaughan of the university, who had been for over twelve years a member of the board, testified, vigorously denying the charges of inefficiency and extravagance which had been made against the board, he stated that Dr. Baker, the present secretary, was one of the most eminent sanitarians in this country, if not in the world, and that Michigan should regard herself as fortunate in securing the services of such a man. He pronounced Dr. Baker to be the most unselfishly devoted to the cause of health in Michigan that any man possibly could be; that Dr. Baker had neglected every opportunity for personal advantage in order to further the work of sanitation in this State; that he had neglected and abandoned every private interest, and the State of Michigan had been the gainer.

Dr. Vaughan then testified relative to his own work as a member of the State Board of Health, telling how he had begun his investigations for the board on the subject of a poisonous element in cheese, and how that work had finally by slow degrees led up to the discovery of the dangerous poison, tyrotoxicon, and how that poison, by reason of the investigations and educational work carried on by the board, had now been practically eliminated from the cheese manufactured in this State.

He stated that a similar line of investigation had led to the discovery of this same poison sometimes existing in milk which produces often fatal cases of cholera infantum. It had also led to the practice, now quite generally observed in this State, of sterilizing milk used as food for infants It has led to the practice by physicians in this State of not permitting infants afflicted with cholera infantum to use milk as food until the disease disappears, and in this way very many lives are now saved which prior to these investigations were lost. All this line of work Doctor Vaughan said was due entirely to the existence of the State Board of Health.

Dr. Vaughan also told of the valuable labors of the State Board of Health in behalf of pure drinking water. He stated that many analyses of samples of drinking water had been made by the board, and that the information given had aided many communities in securing pure water supplies. In this connection he defended the purchase by the board of the microscope, which had been complained of as extravagant. He said that these and other labors instituted by the board had led to the establishment at the university of the laboratory of hygiene, which has proved of such constant and invaluable service. Upon cross-examination Dr. Vaughan swore that the board was keeping abreast if not in the lead in the investigation of new methods of saving life. When asked if the new remedy of antitoxine was receiving attention by the board he said that under a resolution of the board he was investigating and making tests of all samples of antitoxine offered for sale in Michigan. He regretted that the board had not the means at its disposal of preparing this apparently invaluable preventive of diphtheria. He told of his experiments of this remedy upon guinea pigs inoculated with diphtheria, and predicted that the human family would yet receive great benefits from investigations in this line.

Dr. John Avery of Greenville, member of congress, for twelve years a member and during ten of those years the president of the State Board of Health, swore that he had taken notice of the charges which had been made against the board. He said he believed the charges were absolutely

untrue, and characterized them as outrageous. He believed that the present constitution of the board to be wise, and strongly deprecated any change in the present law. He thought the secretary's term of office should not be limited to a specific time. He regarded Dr. Baker as one of the most eminent sanitarians in the country, and doubted whether his place could be filled by any other man. He said that politics had been kept out of the board, and trusted that such would always be the case. He believed, however, that politics would inevitably creep into the board if the secretary had to be appointed every two years.

Prof. Delos Fall, teacher of sanitary science at Albion College, who has made a life study of sanitation, swore that the work of the State Board of Health in saving of life and the prevention of sickness was simply invaluable, that no possible estimate could be put upon it in dollars and cents. He said that the statistics received and tabulated proved beyond doubt that from the two diseases, scarlet fever and diphtheria, there had been a saving in the five years prior to 1890, of over 20,000 cases of sickness and 1,040 deaths. This saving he believed to be largely due to the work of the State Board of Health, in the discovery of sanitary facts and the dissemination of sanitary information.

The foregoing is a short statement of some of the testimony; it would be impracticable to make a further statement of the testimony.

The Committee ceased taking testimony about May 24; but, because of the immense amount of testimony to be typewritten and to be considered, there was not much time left before the last day of the session. The report of the committee was made to the House of Representatives late in the evening of May 28, 1895, during the last hour or two of the session. It read as follows:—

REPORT OF COMMITTEE TO INVESTIGATE STATE BOARD OF HEALTH.*

To the Honorable Members of the House of Representatives of the State of Michigan:

GENTLEMEN—Your committee charged with the duty of investigating the State Board of Health, under a resolution of your honorable body, adopted April 12, 1895, respectfully submit the testimony and the following report of their findings, and ask to be disharged from further consideration of the subject.

THE FINDINGS.

A majority of your committee, after listening to the testimony, and carefully weighing all the evidence adduced, respectfully report the following as their conclusions:

1. We find that the charges against the State Board of Health as set forth have not been proved, in substance or in spirit, in general or in particular. And we characterize them as unfounded, and undoubtedly prompted by ill-will; and so far as made on the floor of the House they must have been the result of deception practiced upon members.

2. We find that the charges of inefficiency, extravagance, etc., made against the secretary of the board are not true. They were substantiated only by the testimony of two witnesses who were obviously prejudiced and

* From Legislative Journal, May 28, 1895.

who had recently left the employ of the Board with threats of vengeance.

3. We find that the charge of plagiarism against the secretary was disproved.

4. We find that the charge that the secretary dominates and controls the board, and holds his office for life, is not true. The secretary does not hold office differently from many other faithful officials in this State. He has served the board and the people efficiently, and has been long retained in office, but he can be discharged at any regular meeting of the board for cause, by a majority vote of the members.

5. We find that the charge that the secretary has purchased useless and expensive instruments is not sustained. The instruments were ordered by the unanimous vote of the board. One of them has proved of great service and the other it is believed will yet do so.

6. We find that the charge that the work of the board is far behind is not true. The routine work of the secretary's office seems to be up to date. The supplemental reports to the annual reports, which contain the matter of present interest to the people, have been published and distributed up to and including a portion of the present year 1895. The regular annual report of the secretary, which contains the tabular and statistical matter is delayed. This is claimed by the secretary to be caused by lack of clerical force in the office sufficient to do the regular work and at the same time to do the additional work required under act 47, laws of 1893, to keep out cholera and other dangerous diseases. Work on that subject has now ceased, and the regular work is again being brought up.

7. We find that the secretary has not abused his office by using the time of the clerks in the preparation of literary articles for private use.

8. We find that the secretary has not neglected his official duties, nor used his time in office hours for work on private matters. On the contrary, the secretary seems to have devoted more time to his official work than is customary with the heads of departments of the State government. He is enthusiastically devoted to the advancement of the cause of sanitation, and, apparently, his colleagues on the board are inspired with like enthusiasm.

9. The charge of extravagance is not sustained. The appropriation for the use of the board is too small to admit of extravagance. The results attained in proportion to the outlay compare most favorably with those of any State board of health.

10. Finally, your committee find that the Michigan State Board of Health as at present organized is one of the most useful and worthy of the departments of our State government. Through it the people have received the unrequited and unselfish labors of distinguished citizens of our State who stand preëminent among the sanitarians of the country. The board has attained a renown second to none among all similar organizations in the world. It has organized and developed a public-health service in this State second to none in efficiency, and which has added to the health, life, happiness and prosperity of our people. It has materially reduced sickness and deaths from several preventable causes, and it is a demonstrable fact that these labors have resulted in an actual money saving to the people of this State, many fold more than their cost.

All of which is respectfully submitted.

(Signed) W. R. EDGAR.
CHARLES HOLDEN.

The foregoing is the majority report, and the following is the minority report:—

The testimony taken in the matter of the investigation of the State Board of Health is so voluminous that the committee has not, and had not, sufficient time to set forth the reasons upon which their findings are based, and are therefore confined to a mere statement of them.

I cannot concur in the first, fourth and sixth findings of the majority of the committee, nor in their statement that the charges against the Board of Health were the result only of the ill-will and prejudice of two ex-employes who left the employ of that board with threats of vengeance. Nor do I consider the excuse given for not issuing any annual report since 1892 as required by law a valid one. From the evidence adduced, I have reached the further conclusion that the secretary of the Board of Health should not be a member thereof, and that his term of office should be a definite one.

A. C. COOK.

The final conclusion by Mr. Cook seems a strange one to reach "from the evidence adduced," considering that the substance of the evidence on that subject is mainly stated in the foregoing brief account, pages cxxxiii, cxxxv.

The investigation was expensive, in many ways: for a stenographer, for the time of the members of the Committee, and for the attorneys employed on both sides, the fees of witnesses, etc., and, greatest of all, for its interference with the public-health work of the State, and with the enactment of proper laws for the better protection of the public health. But, since members of the legislature had listened to the reckless charges made by the ex-clerks and others who are usually present at every session of the legislature to look after interests which it is claimed are interfered with by some of the work of the State Board of Health, the investigation was necessary. And, although it was a harrowing experience to members of the State Board of Health and especially to its secretary, it is hoped that it was worth all it cost in money, annoyance and lives lost through its interference with public-health work and proper public-health legislation, that by contributing to a better knowledge of the sources of opposition to the State Board of Health and its secretary, of the nature of the work done by the Board, of the fact that it is not designed to do certain lines of work which are required of local officials, and of the need for its more liberal support in order to make it more efficient in life-saving work, the investigation may yet yield something of value to the people of Michigan.

REPORT OF THE SECRETARY RELATIVE TO PROPERTY, ETC., FOR THE FISCAL YEAR ENDING JUNE 30, 1895.

To the President and Members of the Michigan State Board of Health:

GENTLEMEN:—In compliance with Section 5 of Article II of the by-laws of this Board, the following report of the "Nature and amount of property belonging to the Board, which has been received, issued, expended and destroyed since the last report, and of the property remaining on hand, and also in whose care each item of property is intrusted," is respectfully submitted.

Preceding reports should enable one to learn the items of property on hand at the beginning of the fiscal year 1895. My last report is printed on pages cxv-cxvii, of the Annual Report for 1894. Since last report, instruments and articles of a similar nature have been purchased as follows:

PHOTO-ENGRAVED PLATES PURCHASED.

One photo-engraved plate—Typhoid fever in Michigan, Cases and Deaths in 1891.

One photo-engraved plate—Reported Deaths from Typhoid fever in Michigan, in each of the 24 years, 1868-91.

Fifteen photo-engraved plates—relating to the Meteorological conditions in Michigan in 1892.

Five photo-engraved plates—relating to Weekly Reports of Sickness in Michigan in 1892.

One photo-engraved plate—Map, exhibiting Distribution of Typhoid fever in Michigan in 1891.

One photo-engraved plate—Reported Deaths from Consumption in Michigan, 24 years, 1869-92.

One photo-engraved plate—Reported Deaths from Diphtheria and Croup in Michigan, 24 years, 1869-92.

One photo-engraved plate—Reported Deaths from Pneumonia in Michigan, 24 years, 1869-92.

One photo-engraved plate—Reported Deaths from Typhoid fever in Michigan, 24 years, 1868-91.

One stereotype plate—Concerning Fogs in Michigan in 1892.

One photo-engraved plate—Diphtheria in Michigan. Cases and Deaths in 1892.

One photo-engraved plate—Scarlet fever in Michigan. Cases and Deaths in 1892.

One photo-engraved plate—Pasteur's Antirabic Inoculations.

One photo-engraved plate—Map exhibiting Distribution of Diphtheria reported in Michigan in 1892.

One photo-engraved plate—Map exhibiting Distribution of Scarlet fever in Michigan in 1892.

One photo-engraved plate—Map exhibiting Distribution of Typhoid fever in Michigan in 1892.

One photo-engraved plate—Typhoid fever in Michigan, Cases and deaths in 1892.

One photo-engraved plate—Alleged Nuisance in Kent Co., Michigan.

One photo-engraved plate—Reported Deaths from Typhoid fever in Michigan, 25 years, 1868-92.

One photo-engraved plate—Reported Deaths from Diphtheria in Michigan, 25 years, 1868-92.

One photo-engraved plate—Map exhibiting Movements of Diphtheria Contagium from *First* to *Second* Locality, etc.

One photo-engraved plate—Measles in Michigan. Cases and Deaths in 1892.

One photo-engraved plate—Map exhibiting overflowed and wet lands constituting an alleged Nuisance in the township of Jefferson, Hillsdale Co., Michigan.

One photo-engraved plate—Low water in wells, and Sickness from Typhoid fever in Michigan, 1878 and 1880-92.

One photo-engraved plate—Reported Deaths from Measles in Michigan, 25 years, 1868-92.

PROPERTY LOANED.

Many photo-engraved plates were loaned to Robert Smith & Co., State printers and binders, Lansing, to be used in printing Annual Reports and other publications of this Board. Most of these plates have been returned, but a few still remain charged to them on the property loan book of this office. The plates will probably be returned as soon as the State Printer is through using them.

PROPERTY RETURNED.

Six photo-engraved plates—Diagrams showing relation of certain Meteorological Conditions to diseases of the lungs and air-passages, were returned by John Bornman and Son, Detroit, Michigan.

One photo-engraved plate—Diseases restricted by public Health Work.

One photo-engraved plate—Average Temperature, by months, in 1885, in Michigan, and three photo-engraved plates—Showing relation of Average Temperature and sickness from Pneumonia in Michigan were returned by E. K. Meyers, State Printer, Harrisburg, Pa.

METEOROLOGICAL INSTRUMENTS PURCHASED.

Three Maximum self-registering thermometers.

Three Minimum self-registering thermometers.

METEOROLOGICAL INSTRUMENTS ISSUED.

To C. E. Beers, meteorological observer, Adrian, Michigan, one minimum self-registering thermometer.
To S. E. Wait, meteorological observer, Traverse City, Michigan.
One maximum self-registering thermometer.
One minimum self-registering thermometer.

METEOROLOGICAL INSTRUMENTS ACCIDENTALLY BROKEN WHILE IN USE BY OBSERVERS.

Two minimum self-registering thermometers by the observer at Adrian, Michigan.
One minimum self-registering thermometer by the observer at Traverse City, Michigan.
One maximum self-registering thermometer, disabled from long use by the observer at Traverse City and returned to this office.
One wet bulb thermometer broken by clerk of this office.

METEOROLOGICAL INSTRUMENTS AND OTHER PROPERTY ON HAND.

2 standard barometers (including one in use at this office).
10 dry bulb thermometers (including one in use at this office).
5 wet bulb thermometers (including one in use at this office).
4 minimum self-registering thermometers (including one in use at this office).
5 maximum self-registering thermometers (including one in use at this office).
1 standard thermometer.
1 standard thermometer for inspecting oils.
3 registering thermometer boards (including one in use at this office).
7 psychrometer boards (including one in use at this office).
1 psychrometer cup, in use at this office.
9 minimum thermometer clips.
5 wet bulb clips.
6 screw bolts for registering thermometers.
7 pins for registering thermometers.
1 hook for hanging barometer.
2 barometer boxes (including one in use at this office).
2 rain gauges (including one in use at this office).
1 basin for rain gauge.
2 cups for overflow tubes to rain gauges.
2 large, galvanized iron pails to measure snowfall.
1 Draper's self-registering thermometer.
1 anemometer, complete, in use at this office.
2 circular magnifying hand glasses.
3 minimum thermometers and 2 maximum thermometers, spoiled by exposure and long use.
3 psychrometer cups, spoiled by rust and long use.
8 psychrometer cups, injured by use; can be repaired.
26 broken thermometers. (Includes all since observations have been taken.)
1 worn-out anemometer spindle.
30 sheets ozone test-paper.

ACCESSIONS TO THE LIBRARY.

Books and other publications have been received and placed in the library of the Board (during the fiscal year ending June 30, 1895) as follows:—

By Gift, Exchange, etc. (Names and Addresses of donors are printed in italics.)

Abbott, Dr. S. W., Sec., Boston, Mass.:
Isolation Hospitals for Infectious Diseases.

Arata Hamao Tokyô, Japan:
The Imperial University Calendar, 1893-94.

Arnold, Dr. C. D., El Reno, Oklahoma Tery.:
Second Biennial Report of the Territorial Board of Health of Oklahoma, 1893-94.
Typhoid Fever.—Its Cause and Prevention.

Baker, Dr. Henry B., Sec., Lansing, Mich.:
Relation of Certain Meteorological Conditions to Diseases of the Lungs and Air-passages, in Colorado.
The Prevention of Typhoid Fever.
Diphtheria in Michigan in 1891.
Names and Addresses of Health Officers in Michigan for the year 1894-95.

Baker, Dr. Henry B.—Continued:
Proceedings of the Menominee Sanitary Convention, April 5 and 6, 1894.
Typhoid Fever in Michigan.
Proceedings Second Annual Conference of Michigan Health Officers, Ann Arbor, June 14 and 15, 1894.
Injuries and Loss of Life and Property by Use of Kerosene, Gasoline and Naptha, year ending Dec. 31, 1891. Reprint No. 422.
Report Michigan State Board of Health, 1892.
Proceedings of Union City Sanitary Convention, Oct. 25 and 26, 1895.

Barbour, Dr. L. P., Monteagle, Tenn.:
The Hygienic and Dietetic Management of Phthisis.

Barringer, Hon. J. E., Armada, Mich.:
Fourth Biennial Report of the State Live Stock Commission for Michigan, years 1891-1892.

Billings, Dr. John S., Washington, D. C.:
Vital Statistics of Boston and Philadelphia, six years ending May 31, 1890.

Billings, Hon. S. R., Commissioner, Lansing, Mich.:
Report of Commissioner of Railroads of Michigan, 1894.

Blanford, S. M., U. S. Weather Bureau, Oregon:
Fiftieth Monthly Report Oregon State Weather Service.
Fifty-eighth Monthly Report Oregon State Weather Service.

Board of Health, Burlington, Vt.:
Annual Report of Health Officer of Burlington, Vt., 1894.

Board of Health, Davenport, Iowa:
Annual Reports of City Officers, Davenport, Iowa, March, 1894.

Board of Health, Fall River, Mass.:
Report of Board of Health of Fall River, Mass., 1893.

Board of Health of Manchester, N. H.:
Annual Report of Board of Health of Manchester, N. H., 1894.

Board of Health of New Bedford, Mass.:
Sixteenth Annual Report of Board of Health of New Bedford, Mass., 1894.

Board of Health of New Haven, Conn.:
Annual Report of Board of Health of New Haven, Conn., 1894.

Board of Health, Rochester, N. Y.:
Annual Report of the Board of Health, City of Rochester, N. Y., year ending March 31, 1894.

Böhmert, Dr. Victor, Director, Dresden, Saxony:
Year Book of the Kingdom of Saxony, 1895.
Zeitschrift des K. Sachsischen Statistischen Bureaus XI Jahrgang. 1894. Heft I and II.

Bowen, D. C., Clerk, Ashbury Park, N. J.:
Annual Report of Board of Health of Ashbury Park, Oct. 1, 1894.

Brigham, Dr. Edwin H., Sec., Boston, Mass.:
Medical Communications of the Mass. Medical Society, Vol. XIV., No. 2.

Brown, Dr., James, Sec., Oregon:
Medical Register State Medical Board of Oregon, 1889.

Bryce, Dr. Peter H., Sec., Toronto, Ontario:
Twelfth Annual Report of the Provincial Board of Health of Ontario for 1893.
Report of the Ninth Annual Meeting of the Association of Executive Health Officers of Ontario, Chatham, August 14 and 15, 1894.

Bureau of Education, Washington, D. C.:
No. 14—The History of Education in Connecticut, by B. C. Steiner, M. D., Yale.
No. 16—Higher Education in Tennessee, by L. S. Merriam, Ph. D.
No. 17—Higher Education in Iowa, by L. F. Parker, Iowa.
No. 19—History of Education in Maryland, by B. C. Steiner, M. D., Yale.
No. 18—History of Higher Education in Rhode Island, by W. H. Tolman, M. D.
Report of Commissioner of Education, Vol. 1, 1891-92.
Report of Commissioner of Education, Vol. 2, 1891-92.

Bureau of Public Sanitation, Rome, Italy:
Relazione Intomo alla Coltivazione delle Raisie nell ágro Pannense, by C. Guerci and Prof. Pagliani.
Epidemia Colerica alt Estero e Misure Preventive nello Stato, by Prof. L. Pagliani.
La Stazione Meteorica e Geotermica annessa al Laboratori Scientifici della direzione di Sanita in Roma, by Dr. L. Luigi.
Study e Modificazione del Processo Rose per la Determinazione delle Impurezze velle Acquaviti, by E. Negli Alcooli.

Bureau of Statistics of the City, Berlin, Germany:
Statistsches Jahrbuck der Stadt Berlin, 1892.

Bureau of Statistics of New Jersey, Trenton:
Report of Bureau of Statistics of New Jersey, 1893.

Bureau of Statistics, State Department, Washington, D. C.:
Consular Reports. September, 1894. Commerce, Manufactures, etc.
Statistical Abstract of the United States, 1894.
Immigration and Passenger Movement of the United States, 1894.
Commerce and Navigation of the United States, 1894.

Burgerstein, M. D., Leo, Wien, Austria:
Handbuch der Schul-Hygiene.

Burr, Dr. C. B., Med. Supt., Pontiac, Mich.:
Report Eastern Michigan Asylum, at Pontiac, two years ending June 30, 1894.

Carmalt, Dr. Wm. H., Sec., New Haven, Conn.:
Transactions of the Congress of American Physicians and Surgeons, Vol. III., 1894.

Carpmael, Charles, Toronto, Ontario:
The Rain and Snowfall of the Province of Ontario, by Hugh Y. Payne.

Cauthorn, Dr. F., Portland, Oregon;
Proceedings Oregon State Medical Society.

Central Meteorological Observatory of Japan, Tokyo:
Annual Report of Central Meteorological Observatory of Japan, 1893, Part I.

Central Sanitary Bureau of Japan, Tokyo:

Annual Report of the Central Sanitary Bureau of Japan, 1890.

A Brief Review of the operations of the Home Department, in connection with the Cholera Epidemic in 1890, with Maps.

Annual Report of the Central Sanitary Bureau of Japan, 1891.

Chalmers, Dr. A. K., Junior Medical Officer, Glasgow, Scotland:

A new life table for Glasgow, based on Mortality of ten years, 1881-90.

Chapin, Dr. Charles V., Registrar, Providence, R. I.:

Eleventh Annual Report of the Superintendent of Health of the City of Providence, R. I., 1893.

Thirty-ninth Annual Report upon the Births, Marriages and Deaths in the City of Providence, R. I., for 1893.

Chase, Dr. H. L., Health Officer, Brookline, Mass.:

Report of the Board of Health of Brookline, Mass., Jan. 31, 1894.

Clark, F. D., Supt., Flint, Mich.:

Michigan School for the Deaf, at Flint, 1893-94.

Cochran, Dr. Jerome, Sec., Montgomery, Alabama:

Transactions of the Medical Association of the State of Alabama.

Cole, G. W., Jersey City, N. J.:

Fourth Annual Report of Free Public Library of Jersey City, N. J., Dec. 1, 1894.

Commissioner of Health, Christiania, Norway:

Beretning ono Folkemaengden og Sundhedstilslander i Christiania i Aaret, 1893.

Commissioner of Labor, Washington, D. C.:

Ninth Annual Report of the Commissioner of Labor, relative to Building and Loan Associations.

Conn, Dr. G. P., Concord, N. H.:

Report of Committee on Car Sanitation before the A. P. H. A., Montreal, 1894.

Transactions New Hampshire State Medical Society, June 18 and 19, 1894.

Notes on the Sanitary Condition of Mexico.

Coulthard, Dr. G. E., Sec., St. Johns, N. B.:

Eighth Annual Report of Provincial Board of Health, New Brunswick, 1894.

Crandall, Dr. H. A., Health Officer, Burlington, Vt.:

Annual Report of Health Officer of Burlington, Vt., year 1894.

Crane, Henry W., Supt., New York City:

One hundred and twenty-fourth Annual Report of the New York Hospital Society, year 1894.

Christie, Prof. W. H. M., Director, Greenwich, England:

Greenwich Magnetical and Meteorological Observations, 1891.

Davis, John F., Butte, Montana:

Report Public Library, Butte, Montana. Catalogue, 1894-1896.

Dick, Dr. James A., Sec., New South Wales:

Annual Address of President T. P. A. Stuart, M. D., Royal Society of New South Wales, 1894.

Director of the Observatory, Rio de Janerio, Brazil:

Ammario Publicado pelo Observatorio de Rio de Janerio para o anno de 1894.

Dobbs, J., Madison, Wis.:

Report Bureau of Labor Statistics, Wisconsin, 1893-94.

Draper, Andrew S., Albany, N. Y.:

Third Annual Report of State Meteorological Bureau and Weather Service of New York State.

Fourth Annual Report of State Meteorological Bureau and Weather Service of New York State.

Dulles, Dr. Charles W., Sec., Philadelphia, Pa.:

Transactions of the College of Physicians and Surgeons, Philadelphia, Vol. 16.

Edwards, Dr. W. M., Med. Supt., Kalamazoo, Mich.:

Report Michigan Asylum for Insane, Kalamazoo, 1893-94.

Fernandez, Dr. J. D., Jacksonville, Fla.:

Proceedings of the Florida Medical Association, Session of 1894.

Foster, Wm. E., Providence, R. I.:

Seventeenth Annual Report, Public Library, Providence, R. I., year ending Dec. 31, 1894.

Fuertes, E. A., Director, Albany, N. Y.:

Fifth Annual Report of State Weather Service of New York, year 1893.

Gerhard, Wm. Paul, Civil and Sanitary Engineer, New York:

The Relations Between Gas Companies and Gas Consumers.

On Gas Burners, Gas Pressure Regulators and Governor Burners, Gas Globes, etc.

The Leading Principles of Scientific House Drainage and Sanitary Plumbing.

A Novel Hot-water Apparatus for Rain or Douche Baths.

The Modern Rain-bath.

Artificial Illumination.

On Testing House Drains and Plumbing Work.

The Use of Gas for Cooking and Heating.

The Rain-bath at the Utica State Hospital.

On Bathing and Different Forms of Baths.

Grimshaw, Thomas, Registrar-General, Dublin, Ireland:

Thirteenth Annual Report of Registrar-General of Ireland.

Supplement to the Twenty-seventh Report of Registrar-General of Ireland.

Happel, Dr. T. J., Trenton, Tenn.:

Morphinism in its Relation to the Sexual Functions and Appetite, and its effects on the Offspring of the users of the drug.

Appendicitis.

Harrington, Prof. Mark W., Chief, Washington, D. C.:

Report of Chief, U. S. Weather Bureau for 1893.

Circular of Information—Protection from Lightning—U. S. Weather Bureau, by Alex. McAdie.

Sensible Temperatures.

Hartwell, Prof. Edward M., Boston, Mass.:
Report of the Director of Physical Training in the Boston Public Schools.

Document No. 8, 1894.

Health Department, New York City:
Annual Report of New York City Board of Health, 1892.

Herrick, Dr. S. S., San Francisco, Cal.:
The Plague 400 years ago and now.

The Sanitary Control of Tuberculosis.

Hewitt, Dr. Chas. N., Sec., St. Paul, Minn.:
Fourth Biennial Report on Vital Statistics of Minnesota, 1892-93.

Hills, Prof. J. L, Director, Burlington, Vt.:
Seventh Annual Report of the Vermont Agricultural Station, 1893.

Bulletins Nos. 43 to 46 inclusive, Vermont Experiment Station.

Hitchcock, Dr. Charles W., Sec., Detroit, Mich.:
Transactions Michigan State Medical Society.

Homan, Dr. Geo., Commissioner, St. Louis, Mo.:
Seventeenth Annual Report Health of Health Commissioner of City of St. Louis, 1894.

A contribution to the study of Water-borne Cholera.

Hope, Dr. D. Sc., E. W., Health Officer, Liverpool, England:
Annual Report of the Health of Liverpool, England, 1894.

Horlbeck, Dr. H. B., Commissioner, Charleston, S. C.:
Annual Reports of the Department of Health, Charleston, S. C., 1893.

Howe, Dr. Edwin J., Newark, N. J.:
Medical Testimony for the Individual Communion Cup. (Two copies.)

Hoyt, Dr. Henry F., Commissioner, St. Paul, Minn.;
Annual Report of the Commissioner of Health of St. Paul, Minn., 1893.

Huyett, M. C., Sanitary Engineer, Detroit, Mich.:
Mechanical Heating and Ventilation.

Mechanical Ventilating and Heating.

Imperial Bureau of Health, Berlin, Germany:
Statistical Year-book of the Imperial Bureau of Health, year 1892.

Imperial Bureau of Statistics, Berlin, Germany:
Medical Statistics for 1892.

Ingersoll, Prof. C. L., Director, Lincoln, Neb.;
Bulletin No. 41. Experiment Station University of Nebraska, relative to "Water-supply in Nebraska," by O. V. P. Stout.

Bulletin No. 39. Experiment Station University of Nebraska.—"Some Obstacles to Successful Fruit Growing," by Fred W. Card.

Jackson, Isaac, Clerk, Lansing, Mich.:
Report of Board State Auditors, Michigan, 1893.

Johns Hopkins Press, Baltimore, Md.:
Public Treatment of Pauperism, International Congress of Charities, Chicago, 1893.

Kelley, Florence, State Factory Inspector, Chicago, Ill.:
First Annual Report of the Factory Inspectors of Illinois, 1893.

First Special Report of the Factory Inspectors of Illinois on Small-pox in Tenement House Sweat-Shops of Chicago, July 1, 1894.

Kimball, Sumner I., Supt., Washington, D. C.:
Report of the Life Saving Service of the U. S., for 1893.

Laing, Roland, Reading, Pa.:
Report of the Board of Health, Reading, Pa., 1893.

Langley, S. P., Sec., Washington, D. C.:
Annual Report of Smithsonian Institution to July, 1893.

Larberge, Dr. Louis, Sanitary Officer, Montreal, Quebec:
Report of the Sanitary State of the City of Montreal, for year 1893.

Leach, Dr. R. B., Paris, Texas:
Aseptic Prophylaxis of Asiatic Cholera Arsenization.

Leick, Dr. George F., Cleveland, Ohio:
Annual Report of the Health Department, Cleveland, Ohio, 1893.

Lemen, Dr. L. E., Registrar, Denver, Col.:
Statistical Report of the Bureau of Health of the City of Denver, Col., years 1892, 1893 and 1894.

Library Board, Dayton, Ohio:
Report of Dayton Public Library, 1893-94.

Mac Clure, Theo. R., Lansing, Mich.:
Rabies and Hydrophobia.

McLeod, Dr. Duncan, Health Commissioner, Detroit, Mich.:
Report of the Sanitary Condition of the City of Detroit.

McShane, Dr. James F., Commissioner, Baltimore, Md.:
Annual Report of Health Department of the City of Baltimore, Md., year 1894.

Mead, Daniel W., Civil Engineer, Rockland, Ill.:
The Hydro-Geology of the Upper Mississippi Valley and of Some of the Adjoining Territory.

Mendenhall, Hon. T. C., Supt., Washington, D. C.:
U. S. Coast and Geodetic Survey, 1892, Part II.

Morse, Hon. Chas. H., Commissioner, Lansing, Mich.:
First Annual Report of the Inspection of Factories in Michigan.

Eleventh Annual Report of the Bureau of Labor Statistics, 1894, Mich.

Twelfth Annual Report of Bureau of Labor of State of Michigan, year ending Feb. 1, 1895.

Twelfth Annual Report of Commissioner of Labor Statistics, 1895.

Second Annual Report of State Factory Inspector, 1895.

Munson, Dr. James D., Med. Supt., Marquette, Mich.:
Report of the Northern Michigan Asylum, 1894.

Naglevoort, J. B., Detroit:
Bulletin of Pharmacy, January, 1895.
Bulletin of Pharmacy, March, 1895.
A plea for an act of humanity.

Newall, Frederick C., Washington, D. C.:
Proceedings of American Forestry Association, 1891-93 inclusive.

New York State Library, Albany:
State Library Bulletin. Legislation No. 5, N. Y. State Library.

Ogden, John, Philadelphia:
21st Annual Report of the Bureau of Water, Philadelphia, 1893.

Olin, Dr. Wm. M., Sec., Boston, Mass.:
First Annual Report of Board of Registration in Medicine, January, 1895, Massachusetts.

Parker, Dr. E. F., Sec., Rock Hill, S. C.:
Transactions S. C. Medical Society, Rock Hill, S. C., April 25 and 26, 1894.

Peckham, Hon. Chas. H., Sec., Providence, R. I.:
Twenty-sixth Annual Report Board of State Charities and Corrections of Rhode Island, 1894.

Peek, M. A., F. S. A., Cuthbert E., Rousdon Observatory, England:
Meteorological Observations for the year 1893, Rousdon Observatory, Vol., 10.

Pingree, Hon. Hazen S., Mayor, Detroit, Mich.:
Sixth Annual Message of Mayor Hazen S. Pingree to the Council of Detroit, Jan. 28, 1895.
Address on Home Rule in Detroit.

Platt, S. S., Civil Engineer, Rochdale, England:
A number of diagrams, plans, etc., relative to pail closets, ash places, garbage carts, etc.
The Rochdale system of Nightsoil Collection and Manufacture and its beneficial results.
Report of the Various Committees of the Council on work done during year ending March 25, 1890.
Annual Reports of the Medical Officer of Health, Rochdale, England, 1881 to 1893 inclusive.

Plunkett, Dr. J. D., Nashville, Tenn.:
City Progress and Public Health.

Prendergast, Dr. J. W., Commissioner, Cincinnati:
Report of Department of Health, Cincinnati, 1893.

Probst, Dr. C. O., Sec., Columbus, Ohio:
The Prevention of Tuberculosis.

Prudden, Dr. T. Mitchell, New York City:
Concurrent Infection and the Formation of Cavities in Acute Pulmonary Tuberculosis.
Studies from the Department of Pathology, College of Physicians and Surgeons, Vol. III, 1894.

Pullman Co., Pullman, Ill.:
The Strike at Pullman, Ill.

Reid, Dr. A. P., Halifax, N. S.:
Second Annual Report of Provincial Board of Health, year 1894.
Twenty-eighth Annual Report of Victoria General Hospital, year ending Sept. 30, 1894.

Reynolds, Dr. Arthur R., Commissioner, Chicago, Ill.:
Annual Report of the City Department of Health of Chicago, 1893.
Annual Report of Health Commissioner of Chicago, Ill., 1894.

Robinson, J., Toronto, Ontario:
Twenty-sixth Annual Report of the Inspector of Prisons and Public Charities, Province of Ontario, 1893.

Ruggles, Dr. C. A., Stockton, Cal.:
Opening address of the Sanitary Convention at San José, Cal., April 16, 1894.

Russell, Dr. James A., Edinburgh, Scotland:
Proceedings of the Royal Society of Edinburgh, Sessions 1892-93 and 1893-94, Vol. XX.

Salmon, Dr. D. A., Chief, Bureau Animal Industry, Washington, D. C.:
Investigations concerning Bovine Tuberculosis.
Hog Cholera and Swine Plague. Bulletin No. 24. Bureau of Animal Industry.

Saville, M. D., J. J., Omaha, Neb.:
Seventh Annual Report of Health Commissioner, Omaha, Neb., 1894.

Secretary of State, Lansing, Mich.:
Biennial Report of the Board of Control and Officers in the State House of Correction and Branch of State Prison in Upper Peninsula, 1894.
Report of the Michigan State Prison, 1894.

Secretary of State, Washington, D. C.:
Special Consular Reports—Extension of Markets for American Flour, Vol. X.
Special Consular Reports—American Lumber in Foreign Countries, Vol. XI.
Consular Report, February, 1895.

Seward, F. D., Sec., St. Louis:
Proceedings of the Eleventh Annual Convention of the National Confectioners' Association at Boston, July 10-12, 1894.

Shedd, J. H., City Engineer, Providence, R. I.:
Annual Report of the City Engineer of Providence, R. I., 1893.

Smock, John C., State Geologist, Trenton, N. J.:
Annual Report of State Geologist of New Jersey, for year 1893.
Geological survey of the State of New Jersey, Vol. 3. Water-supply.

Staples, Dr. Franklin, Health Officer, Winona, Minn.:
Annual Report of Board of Health of Winona, Minnesota, year ending March 31, 1895.

State Board of Health of California, Sacramento:
Thirteenth Biennial Report California State Board of Health, 1893-94.
Biennial Report California State Board of Health, 1886-88.

State Board of Health of Connecticut, New Haven:
Annual Report of the State Board of Health of Connecticut, 1894.

State Board of Health of Florida, Jacksonville:
Fifth Annual Report of the Florida State Board of Health, Jacksonville, March 31, 1894.
Sixth Annual Report of the Florida State Board of Health, Jacksonville, January 1, 1895.

State Board of Health of Illinois, Springfield:
Fifteenth Annual Report of the State Board of Health of Illinois, 1894.
Minutes of the Meeting State Board of Health of Illinois, Springfield, Nov. 13-14, 1894.

State Board of Health of Iowa, Des Moines:

Iowa Health Laws and Decisions of the Supreme Court, of the Attorney General and the State Board of Health on the Powers and Duties of Local Boards, and on Nuisances.

Ventilation pamphlet published by the State Board of Health of Iowa.

State Board of Health of Maine, Augusta:

Eighth Annual Report of State Board of Health of Maine, two years ending Dec. 31, 1893.

State Board of Health of Massachusetts, Boston:

Report of Mass. State Board of Health upon the Improvement of Charles River, April, 1894.

Report of Mass. State Board of Health, 1893.

State Board of Health of Alabama, Montgomery:

Report of the State Board of Health of Alabama for 1893.

State Board of Health of New Jersey, Trenton:

Eighth Annual Report, N. J., State Board of Health, 1884.

Tenth Annual Report, N. J., State Board of Health, 1886.

Fourteenth Annual Report, N. J., State Board of Health, 1890.

Fifteenth Annual Report, N. J., State Board of Health, 1893.

Seventeenth Annual Report, N. J., State Board of Health, 1893.

Laws relating to Public Health in New Jersey. Circular No. 60.

State Board of Health of New York, Albany:

Department of the State Engineer and Surveyor, Genesee River Storage Survey.

Fourteenth Annual Report, State Board of Health of New York, Vol. I.

Fourteenth Annual Report, State Board of Health of New York, Vol. II.

Maps with Fourteenth Annual Report, State Board of Health of New York.

State Board of Health of New Hampshire, Concord:

Report of the N. H. State Board of Health, Vol. 12, 1893.

State Board of Health of North Dakota, Valley City:

Biennial Report of State Board of Health of North Dakota, 1893-94.

State Board of Health of Ohio, Columbus:

Report of the State Board of Health of Ohio, 1893.

State Board of Health of Pennsylvania, Philadelphia:

Report of State Board of Health of Pennsylvania, 1893.

State Board of Health of Rhode Island, Providence:

Sixteenth Annual Report of the State Board of Health of the State of Rhode Island, year 1893.

State Board of Health of South Dakota, Huron:

Report of State Board of Health of South Dakota, 1893-94.

State Board of Health of West Virginia, Martinsburg:

Consumption. Its Causes and the Means of Preventing it.

Biennial Report of the Secretary, State Board of Health, W. Va., 1893-94.

State Board of Health of Wisconsin, Milwaukee:

Fifteenth Report of State Board of Health of Wisconsin, 1893-94.

Sternberg, Dr. George M., Surgeon-General, Washington, D. C.:

Index Catalogue of the Library of the Surgeon-General's Office of the U. S. Army, Vol. XV.

Sterns, Henry P., Hartford, Conn.:

Seventy-first Annual Report of Officers of Retreat for the Insane, Hartford, Conn., April, 1895.

Storrs, Hon. C. E., Lansing, Mich.:

Second Annual Report of the Dairy and Food Commissioner of State of Michigan, 1894.

Strong, Chauncey, Clerk, Kalamazoo, Mich.:

Annual Reports of Officers of Kalamazoo, 1894.

Taneyhill, Dr. G. Lane, Sec., Baltimore, Md.:

Transactions of the Medical and Chirurgical Faculty of Maryland, 96.

Annual Session held at Baltimore, Md., April, 1894, also Semi-Annual Session at Annapolis, Nov., 1893.

Taylor, Dr. J. Stopford, Health Officer, Liverpool, England:

Annual Report of the Health of Liverpool, 1893.

Taylor, Dr. Thomas, Chief, Washington, D. C.:

Report of the Chief of the Division of Microscopy for the year 1893.

Turner, Hon. Stanley W., Auditor General, Lansing, Mich.:

Annual Report of the Auditor General of Michigan, year ending June 30, 1894.

Underwood, W. O., Boston, Mass.:

An Act to suppress contagious diseases among domestic animals, in Mass., June, 1894.

U. S. Civil Service Commission, Washington, D. C.:

Tenth Report of U. S. Civil Service Commission, July 1, 1892, to June 30, 1893.

U. S. Department of Agriculture, Washington, D. C.:

Experiments with Sugar Beets in 1893, by Prof. H. W. Wiley.

Additional Investigation Concerning Infectious Swine Diseases—Bulletin No. 6—Agricultural Department, by Theo. Smith, Ph. B., M. D.

Sweet Cassava, its Culture, Properties and Uses, by Prof. H. W. Wiley.

Foods, Nutritive value and cost, by W. O. Atwater, Ph. D.

Experiment Station Record, Vol. 6, No. 5, Department of Agriculture.

Foods, Nutritive value and cost. Bulletin No. 23, by Prof. W. O. Atwater.

Methods and results of Investigations on the Chemistry and Economy of Food, by Prof. W. O. Atwater.

Venable, E. P., Sec., Chapel Hill, N. C.:
Journal of the Elisha Mitchell Scientific Society, 1894. Part First.
Journal of the Elisha Mitchell Scientific Society, 1894. Part Second.

Waddlin, Horace G., Chief, Boston, Mass.:
Twenty-fourth Annual Report of the Bureau of Statistics of Labor, March, 1894.
The Annual Statistics of Manufacturers, 1893.

Warner, Dr., Ph. D., Amos G., Washington, D. C.:
Report of Sociology in Institutions of Learning.

Wedderburn, Geo. C., Baltimore, Md.:
Annual Report of City Librarian of Baltimore, Md., year 1894.

West, Dr. H. A., Sec., Galveston, Texas:
Transactions State Medical Association of Texas.

Wilbur, Dr. C. L., Registrar, Lansing, Mich.:
Twenty-sixth Registration Report of Michigan, Vital Statistics, 1892.

Wiley, H. W., Washington, D. C.:
Report on the Extent and Character of Food and Drug Adulteration, by A. J. Wedderburn, special Agent.

Wiley, H. W.—Continued:
A Compilation of the Pharmacy and Drug Laws of the several States and Territories, by A. J. Wedderburn, special Agent.
Proceedings of the Eleventh Annual Meeting of the Association of Official Agricultural Chemists, at Washington, Aug. 23-25, 1894.

Wood, Dr. E. M., Sec., Winnipeg, Manitoba:
Practical Hints for checking the spread of Infectious Diseases in Manitoba.

Wright, Dr. Frank W., Health Officer, New Haven, Conn.:
Twenty-first Annual Report of the Board of Health of the City of New Haven, Conn., 1893.

Wyman, Dr. Walter, Supervising Surgeon-General, U. S., M. H. T., Washington, D. C.:
Annual Report of Supervising Surgeon-General, year 1893, Vol. 1.
Annual Report of Surgeon-General, Marine Hospital Service, year 1893, Vol. 2.

Young, Dr. A. G., Sec., Augusta, Maine:
First Annual Report on Births, Marriages, Divorces and Deaths in the State of Maine.

ACCESSIONS BY PURCHASE.

Annual Report of Sanitary Commissioner with Government of India, 1892.
On the Features which distinguish Epidemic Roseola (Roserash) from Measles and from Scarlet Fever, by Clement Dukes, M. D.
Warming Buildings by Hot Water, by Charles Hood, F. R. S.
Directions for Laboratory Work in Bacteriology, by Prof. F. G. Novy, M. D.
Reference Handbook of the Medical Sciences, Vol. IX, Supplement, New York.
Micro-organisms in Water, by Percy and C. C. Frankland.
Supplement Twenty-second Annual Report of the Local Government Board, 1892-3, containing the Report of the Medical Officer, for 1892-93, London.
Modern Methods of Sewage Disposal, by George E. Waring, C. E.
A Hand-Book of Medical Microscopy, by James E. Reeves, M. D.
Syphilis in the Innocent, by L. Duncan Bulkley, M. D.
Public Treatment of Pauperism, International Congress of Charities, Chicago, 1893.
Small-Hospitals, Establishment and Maintenance, by A. Worcester, M. D., A. M.
Two Monographs on Malaria and the Parasites of Malarial Fever, by Marchiafava and Bignami Mannaberg.
A Manual of Hygiene, by Mary Taylor Bissell, M. D.
Uric Acid in the Causation of Disease, 2nd Edition, by Haig.
Commitment, Detention, Care and Treatment of the Insane; Proceedings of International Congress of Charities and Corrections.
Standard Dictionary of the English Language, by Isaac K. Funk.
Meteorology, by Thos. Russell.
Lectures on the Spinal Cord, by Dr. Pierre Marie.
The Care of Dependent, Neglected and Wayward Children. John Hopkin's Press.
How much money is your life worth?
Annual Report Sanitary Commissioner of India, 1893.
An American Text-Book of the Diseases of Children, by Dr. Louis Starr.
American Lancet, Detroit.
Scientific American and Supplement.
U. S. Official Postal-Guide, with monthly supplements.
Medical News, Philadelphia.
American Journal Medical Sciences, Phila.
Popular Science Monthly, New York.
London Lancet.
Nature, London.
British Medical Journal.
Sanitarian, Brooklyn.
American Meterological Journal, Boston.
Sanitary Record, London.
Sanitary Journal, Glasgow.
Centralblatt fur Bakteriologie und Parasitenkunde, Berlin.

The following-named periodicals have been purchased for Members of the State Board of Health:—
Nature, to Hon. Frank Wells, Lansing.
London Lancet, to Mason W. Gray, M. D., Pontiac.
Popular Science Monthly, to Dr. George H. Granger, West Bay City.
Sanitarian, to Prof. Delos Fall, Albion.
Journal of the American Medical Association, to Dr. Samuel G. Milner, Grand Rapids.

ACCESSIONS BY EXCHANGE.

Received in exchange for Publications of this Board (in some instances incomplete volumes).

American Exchange and Review, Phila.
American Practitioner and News, Louisville, Ky.
Annals of Hygiene, Phila.
Architecture and Building, New York.
Buffalo Medical and Surgical Journal.
Bulletin de L'Academie Royale de Medicine de Belgique, Brussels.
American Lancet, Detroit.
Brooklyn Medical Journal.
Bulletin: Cornell University, Ithaca, N. Y.
Iowa State Board of Health, Des Moines.
Florida State Board of Health, Jacksonville.
Maine State Board of Health, Augusta.
Mexico National Board of Health, Mexico City.
Ohio State Board of Health, Columbus.
North Carolina State Board of Health, Wilmington.
Rhode Island State Board of Health, Providence.
Tennessee State Board of Health, Nashville.
Canada Educational Monthly, Toronto.
Canada Lancet, Toronto.
Canadian Practitioner, Toronto.
Cleveland Medical Journal, Cleveland.
College and Clinical Record, Phila.
Columbus Medical Journal, Columbus, Ohio.
Confectioners' Journal, Phila.
Clinical Review, Chicago.
Dietetic and Hygienic Gazette, New York.
Good Health, Battle Creek.
Experiment Station Record, Washington.
Indicator, Detroit.
Fort Wayne Medical Journal.
Journal American Medical Assoc., Chicago.
Journal D'Hygiene, Paris.
Journal Franklin Institute, Phila.
Journal Comparative Veterinary Archives, N. Y.
Lehigh Medical Monthly, Evanston, Penn.
Leonard's Illustrated Medical Monthly, Detroit.
Medical Age, Detroit.
Medical Brief, St. Louis.
Medical Bulletin, Phila.
Medical Examiner, N. Y.
Medical and Surgical Reporter, Phila.
Medical Review, St. Louis.
Manufacture and Builder, New York.
Maryland Medical Journal, Baltimore.
Memphis Medical Monthly, Memphis, Tenn.
Nashville Journal of Medicine, Nashville, Tenn.
New York Medical Journal, N. Y. City.
National Popular Review, Chicago.
Physician and Surgeon, Ann Arbor.
Quarterly Returns of Births and Deaths of Dublin, Ireland.
Quarterly Reports of the Royal Meteorological Society, England.
Revue Internationale Bibliographie, Paris, France.
Sanitary Record, Londo .
Sei-i-kwai Medical Journal, Tokyo, Japan.
Semena Medica, Buenos Aires, Argentine Republic.
Tablantes Mensuelles, Brussels, Belgium.
Texas Sanitarian, Austin, Texas.
Veroff, des Kaiserlich Deutchen Gesundheitamtes, Berlin.
Virginia Medical Monthly, Richmond.
Weekly Returns of Births and Deaths, Dublin, Ireland.

LOANS FROM THE LIBRARY.

Publications which have been drawn out but not yet returned to the library of the Board, are as follows:—

HENRY B. BAKER, M. D., LANSING, MICHIGAN.

Science, March 24, 1893 (Current No.).
U. S. Abstract of Sanitary Reports, Vol. 8, April 14, June 9, and June 23, 1893 (Current Nos.).
Manufacturer and Builder, March, 1889 (Current No.).
Education and Culture as Relates to Health and Disease of Women (Library No. 7470).
Uric Acid in Causation of Disease, by Haig (Library No. 9348).

HOWARD B. BAKER, LANSING, MICHIGAN.

Gould's Medical Dictionary. (Library No. 7744.)

PROF. S. W. BAKER, BIG RAPIDS, MICHIGAN.

Sanitary Condition of Schoolhouses, etc.
Amer. Social Science Assoc., 1874 (Library No. 878).
Report of Committee Concerning Sanitary Condition of Schools in Phila. (Library No. 1767.)
Trans. Sanitary Institute, Great Britain, 1879 (Library No. 4388).

PROF. DELOS FALL, M. S., ALBION, MICHIGAN.

[illegible] Board of Health, 1883 (Library No. 3945).

JOHN HEVENER, LAPEER, MICHIGAN.

spitals; their Organization and Construction (Library No. 8806).
ttage Hospitals, by H. C. Burdett (Library No. 2470).

WILLIAM C. HUME, M. D., CORUNNA, MICHIGAN.

ee Communications, by Gibier (Library No. 7716).

PROF. R. C. KEDZIE, M. D., AGRICULTURAL COLLEGE, MICHIGAN.

ual Report of National Board of Health, 1879 (Library No. 2825).

HENRY F. LYSTER, M. D., DETROIT, MICHIGAN.

erage at Providence, R. I., by Waring (Library No. 4784).
m water in Town Sewerage, by Waring (Library No. 2441).
erage of Cities, by Waring (Library No. 2442).
arate System of Sewerage, by Waring (Library No. 2907).
natic Treatment of Consumption (Library No. 6288).
ical Committees of the Mass. Medical Society (Library No. 4740).
Philanthropic Index and Review, June, 1889.
ain on Lunacy (Library No. 1022).
ain—New Facts and Remarks on Idiocy (Pamphlet).
dren of the State (Library No. 5545).
ference of Corrections and Charities, Omaha, 1887.

SAMUEL G. MILNER, M. D., GRAND RAPIDS, MICHIGAN.

ities on Hygiene, by Stevenson and Murphy (Library No. 8269).

THEO. R. MAC CLURE, LANSING, MICHIGAN.

ham's Phonetic Dictionary (Library No. 8754).
eria Medica and Therapeutics, by Bartholow (Library No. 668).
y's Anatomy (Library No. 8788).
ott's Principles of Bacteriology (Library No. 8162).
ge's Practice of Medicine, Vol. 1 (Library No. 6727).
ge's Practice of Medicine, Vol. 2 (Library No. 6728).
w to use the Microscope, by Beale (Library No. 133).
ual of Microscopic Mounting, by Martin (Library No. 151).
y on Microscopic Technology (Library No. 128).
stical Biology, by Huxley and Martin (Library No. 2143).
t-Book on Zoölogy, by Nicholson (Library No. 155).
roscopical Technology, by Friedlander (Library No. 5283).
ter Analysis, by J. D. MacDonald (Library No. 641).
rnal D'Hygiene, Vol. 17, 1892 (Library No. 9017).
gstaff's Statistics (Library No. 7645).
l. Iowa State Board of Health, Vols. 3-5, 1889-92.
rnal American Medical Sciences, Jan., April, July, Oct., 1887.
ue Internationale Bibliographie, Vol. 2, 1892 (Library No. 9063).
tish Medical Jour., Vol. 2, 1889 (Library No. 8996).
tish Medical Jour., Vol. 1, 1890 (Library No. 8995).
teria and Their Products, by Woodhead (Library No. 8074).
tralblatt fur Bakteriologie und Parasitenkunde, Vol. 13, 1893 (Library No. 9059).
w York Therapeutic Gazette, No. 2, 1894 (Current No.).
dical News, Vol. 64, June 16, 1894 (Current No.).
l. Minn. State Board of Health, Vol. 6-8 (Library No. 9239).
tish Medical Jour., Jan.-June, 1893 (Library No. 9173).
port of Bureau of Animal Industry (Library No. 7638).
erican Text-Book of Diseases of Children (Library No. 9324).
t-Book on Meteorology (Library No. 170).
ather (Library No. 6650).
nciples of Biology, by Spencer (Library No. 707).
s Story of the Bacteria, by T. Mitchell Prudden, M. D., (Library No. 7137).

HON. FRANK WELLS, LANSING, MICHIGAN.

National Pure Food Commission, 1887 (Library No. 5780).
2d Ann. Report of the S. C. State Board of Health, 1881 (Library No. 2698).
Medical News, for July 18 and 25, 1891 (Current Numbers).
Supplement to British Medical Journal, July 20. 1891 (Current Number).

The following table shows the amount and kind of hard paper there was on hand at the time of making the last report, the amount purchased during the year, the amount used, and the amount now on hand:—

Kind of Paper.	On hand at last Report.		Purchased since last Report.		Used during the fiscal year 1895.		On hand June 30, 1895.	
	Reams.	Sheets.	Reams.	Sheets.	Reams.	Sheets.	Reams.	Sheets.
Flat	3	28				195	2	313
Crown	5	215	20		13	277	11	418
Folio-post	20	115	25		28	256	16	389
Demy	1	389	5			487	5	402
Medium	3	220				20	3	200
Byron Weston		145						145
Imperial	1						1	
Fools cap		310				110		200
Legal cap	1	140				110	1	30
Blue-cover paper	5	75	12		4	402	12	153
Postoffice paper	1	200					1	200
Book paper S. S. C. white	3	59					3	59
Manilla paper	2	245	4		2	201	4	44

There are now on hand 10,570 sheets of hard paper of half letter size, 500 sheets of note size, and 900 sheets of half note size. There were about 157,027 envelopes on hand at the time of making the last report; 30,000 of the various kinds used in the office have been purchased since—making a total of 187,027. There are now on hand 68,009 printed envelopes, and 74,090 blank envelopes, making a total of 142,099. About 44,928 have been used in the work of the office.

Vouchers for postage (for use in the office) have been allowed during the fiscal year to the amount of $1,310.00. The cost of postage during the fiscal year has been $1,101.93, as follows:—

Distribution of Annual Reports	$310 96
General distribution of documents and circulars	398 76
Sending weekly and monthly bulletins	41 25
Collection and dissemination of statistics and information in regard to communicable and other diseases	60 00
Second and third requests for annual reports from townships, cities and villages, required by law	75 86
Sending out announcements and programs for sanitary conventions	65 47
Sending meteorological material to observers	6 87
Work in connection with collection of sickness statistics	16 10
Sending notices of possibly infected immigrants, etc., in connection with State Quarantine	5 00
Regular and special correspondence of the office, and all other postage (including a considerable amount for distribution of documents on the restriction of diphtheria, scarlet fever, typhoid fever, etc., to localities where those diseases occurred)	222 16
Postage money on hand	208 07
	$1,310 00

TOTAL AMOUNT AND CLASSIFICATIONS OF EXPENDITURES BY THE STATE BOARD OF HEALTH, AS PER VOUCHERS 2446-69 AND 2671-74, INCLUSIVE, ALLOWED DURING THE FISCAL YEAR ENDING JUNE 30, 1895.

Chemical Analyses	$50 00
Expenses of Members:—	
Attending Meetings	124 80
Other Official	238 45
Instruments and books	125 49
Paper, Stationery, etc.	361 48
Postage:—	
Office	1,310 00
Members	1 00
Printing and Binding	681 26
Secretary	3,000 00
Expressage	34 10
Telegrams	17 89
Telephones	29 25
Miscellaneous	144 86
	$6,112 58

EXPENDITURES BY THE STATE BOARD OF HEALTH IN THE CALENDAR YEAR, 1894.

The foregoing is reported, in compliance with law, relative to the fiscal year. But the appropriations of the Board are for the calendar year, and they amount to six thousand dollars. The expenditures for any calendar year, therefore, cannot exceed six thousand dollars. The following is a classified statement of expenditures for the calendar year 1894.

CLASSIFIED STATEMENT OF EXPENDITURES BY THE BOARD DURING THE CALENDAR YEAR, 1894.

Chemical Analyses	$50 00
Expenses of Members:—	
Attending Meetings	63 20
Other Official	585 48
Instruments and books	208 33
Paper, Stationery, etc.	209 44
Postage:—	
Office	1,210 00
Members	1 00
Printing and Binding	519 46
Secretary	3,000 00
Expressage	52 26
Telegrams	18 00
Telephone	30 00
Miscellaneous	52 71
	$5,999 87

EXPENDITURES ON ACCOUNT OF THE BOARD.

The appropriations ($6,000) at the disposal of the State Board of Health are for certain specified purposes, not including clerk hire, the publication of the annual report, or the expenses in the examination of plans for public buildings; these expenditures *on account of* but not by the Board are provided for by other acts of the legislature than those appropriating money to be expended by the Board, and the accounts are kept in other offices; not in the Office of the State Board of Health; the accounts for clerk hire are kept by the Auditor General, and are reported in his annual report; the accounts for publication of the annual report of this Board, and for expenses in the examinations of plans for public buildings, are kept by the Board of State Auditors, and are published in the annual report of that Board.

Respectfully submitted,

HENRY B. BAKER,
Secretary.

[PART II.]

IPAL METEOROLOGICAL CONDITIONS IN MICHIGAN IN 1894.

SONS OF CONDITIONS IN 1894 WITH THOSE IN PRECEDING YEARS.

LATION OF REPORTS BY OBSERVERS FOR THE STATE BOARD ALTH AND FOR THE UNITED STATES WEATHER BUREAU.

UNDER THE DIRECTION OF THE SECRETARY OF THE MICHIGAN STATE BOARD OF HEALTH.

Annual Reports of this Board, there has been published for e years 1877 to 1893, inclusive, a summary relative to the prin- orological conditions as observed during the year. This paper the subject for the year 1894. The names of the observers for and the months in that year for which copies of registers of gical conditions were received from each, are stated in Exhibit . In Exhibit 2, page 3, is given the latitude, longitude, and of each of these stations. In the tables which follow, reports rom any observer for less than half the year have not been used. ncipal conditions treated in the following tables are tempera- ive and absolute humidity of the air, cloudiness, fogs, rainfall, ter levels, ozone, velocity and direction of the wind, and pres- e atmosphere. The tables on each subject are illustrated by representing to the eye variations in the given condition from month through the year, at the several localities represented. bles give not only the meteorological conditions for the year and der consideration, but they also contain, for purposes of com- tatements of the average conditions for the longest period avail- ch case.

atter part of the Annual Report volume for 1886, there was an article on "The Causation of Pneumonia," in which exten- as made of meteorological statistics, especially those relating to rology of Michigan. In the Annual Report for 1887, in an "The Causation of the Cold-weather Diseases," influenza, bronchitis, scarlet fever, diphtheria, and small-pox are proved very close relations to meteorological conditions. Extensive eorological and sickness statistics is made in the Report for n article entitled "The Relations of Certain Meteorological s to Diseases of the Lungs and Air-passages." In the Report

for 1891, "Abstract of Proceedings, April 14, 1891," in a discussion on the subject of "The Causation of Influenza," is an important use of the meteorological data, with diagrams and other evidence, showing how closely influenza is associated with atmospheric temperature, humidity, ozone and wind. In the Report for 1891, page cxxvii, is an article entitled "Relations of Certain Meteorological Conditions to Diseases of the Lungs and Air-passages in Colorado," in which are also data relative to other States and countries. In the Report for 1894, pages clix-clxiv, is a paper on "The Causation of Influenza and Allied Diseases with Suggestions for their Prevention," in which important use is made of the meteorological data collected in Michigan since 1877. In each of the Annual Reports of this Board since that for the year 1877 considerable use has been made of the sickness statistics in Michigan for the complete study of which, data of the meteorological conditions coincident with the sickness is required.

EXHIBIT 1.—*Names of observers whose reports are summarized in the following Meteorological Tables and Diagrams, their places of observation, and the counties and geographical divisions of the State in which these places are situated, and months for which reports were received from each observer.*

Name of Observer.	Place of Observation.	County.	Division of the State.*	Months (inclusive) for which Registers were Received.
W. C. Gates, M. D.	Rockland	Ontonagon	U. P.	January to December.
H. R. Patrick, Observer, U. S. Weather Bureau	Marquette	Marquette	U. P.	January to December.
C. L. Bozzell, Observer, U. S. Weather Bureau	Sault Ste. Marie	Chippewa	U. P.	January to December.
S. E. Waite	Traverse City	G'd Traverse	N. W.	January to December.
H. McP. Baldwin, Observer, U. S. Weather Bureau	Alpena	Alpena	N. E.	January to December.
D. W. Mitchell, M. D.	Harrisville	Alcona	N. E.	January to December.
Geo. W. Felger, Observer, U. S. Weather Bureau	Grand Haven	Ottawa	W.	January to December.
J. W. Ash	Ashton	Osceola	N. C.	April to December.
Wm. M. Edmondson, Observer, U. S. Weather Bureau	Port Huron	St. Clair	B. & E.	January to December.
John S. Calkins, M. D.	Thornville	Lapeer	B. & E.	January to December.
Prof. R. C. Kedzie	Agr'l College	Ingham	C.	January to December.
Wm. M. Force	Office State B'd of Health, Lansing	Ingham	C.	January to December.
C. E. Beers	Adrian	Lenawee	S. C.	January to December.
Prof. C. E. Barr, A. M.	Albion	Calhoun	S. C.	Jan. to June and Oct. to Dec.
Asaph Hall, Jr., Director, Detroit Observatory	Ann Arbor	Washtenaw	S. C.	January to December.
Prof. J. H. Kellogg, M. D.	Battle Creek	Calhoun	S. C.	January to December.
Wm. M. Edwards, M. D., Supt. Asylum for Insane	Kalamazoo	Kalamazoo	S. C.	January to December.
Lewis Marvill	Parkville	St. Joseph	S. C.	January to December.
C. C. Tefft	Tecumseh	Lenawee	S. C.	January to December.
S. Alexander	Birmingham	Oakland	S. E.	January to December.
Edward A. Evans, Director, Mich. Weather Service	Detroit	Wayne	S. E.	January to December.

* The counties in each division are stated in Exhibit I. on subsequent page.

The article in this Annual Report in relation to "Causes of Diseases," based upon weekly reports of sickness in Michigan, may well be studied

in connection with this article, the main purpose of which is to serve as a basis for studies of the causes of diseases.

It is believed that there is nowhere else so complete a statement of the facts relating to meteorology of Michigan as is here presented, for any use for which such knowledge may be needed, now or hereafter.

EXHIBIT 2.—*Latitude and Longitude, Elevation above Sea Level, and the Average Temperature, and Average Barometric Pressure in 1894, at 9 Meteorological Stations in Michigan,—the names of the Stations being arranged in order by latitude, highest first.*

Localities in order of Latitude, those farthest North, first.	Latitude North.	Longitude West from Greenwich.	Altitude (Approximate) above Sea Level.—Feet.	Height of Mercury in Cistern of Barometer above Sea Level.—Feet.	Average Temperature, 1894.—Degrees Fahr.	Average Atmospheric Pressure, 1894. Inches of Mercury corrected for Temp.
Rockland			1,190.34		44.26	28.635
Marquette	46°34'	87°24'	669.			
Sault Ste. Marie	46°28'	84°22'	642.			
Alpena	45°5'	83°3'	587.			
Traverse City	44°45'	85°40'	598.	605.	47.20	29.304
Harrisville	44°39'	83°18'	616.		44.15	
Manistee	44°13'	86°16'	600.			
Ashton	43°58'	85°45'	700.			
Grand Haven	43°5'	86°18'	590.			
Port Huron	43°0'	82°26'	602.			
Thornville	* 42°55'	* 83°10'	§ 975.	§ 980.	50.32	28.938
Agricultural College	42°44'	84°29'	820.	834.	48.58	29.038
Lansing, S. B. of H.	† 42°44'	† 84°33'	¶ 900.	917.	49.00	29.077
Birmingham	42°30'	83°10'	‡ 752.		49.95	29.107
Detroit	42°20'	83°3'	603.9			
Battle Creek	42°20'	85°11'	800.		51.83	29.110
Kalamazoo	42°18'	85°37'	944.			
Ann Arbor	42°17'	83°44'	930.	936.	49.49	29.035
Marshall	42°17'	84°58'	833.	886.		
Albion	42°14'	84°45'	965.	985.25		
Tecumseh	* 42°1'	* 83°57'	835.		49.68	29.151
Adrian	41°53'	84°11'	770.		49.95	29.134

* Estimated from lines on a map of Michigan, issued by the General Land Office, Department of the Interior, 1878. For stations having no reference mark, the latitude and longitude were stated by the observer on the meteorological reports received.

† The exact latitude and longitude of the astronomical post placed in the ground near the new Capitol at Lansing, by the U. S. Lake Survey in 1875, as determined by the observations then made, is 42°43' 55.11" N. and 84°33' 19.68" W.

‡ Estimated from data on "Railroad Profiles," pages 179-187, Annual Report of the State Board of Health for 1878.

§ Estimated from data in Tackabury's Atlas of the State of Michigan.

¶ Estimated from comparisons of barometrical observations at Lansing, Port Huron, and Grand Haven for the four years, 1879-82.

NOTE.—Green's standard barometer was used at the above stations for the year 1894.

EXHIBIT 3.—*Average Temperature by Year and Months, for each of the 1877-94, and the Average for the 17 Years, 1877-93. These Averages are for G of Several Stations in Michigan.*

Years, etc.	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov
Av. for 17 Yrs., '77-93.	46.11	21.01	23.63	29.45	44.25	55.73	66.00	70.65	67.96	61.13	49.46	36.2
1877	48.67	19.18	32.27	25.92	46.71	58.24	67.48	72.80	70.52	63.80	52.78	37.5
1878	49.24	27.17	29.75	41.46	52.27	54.73	65.18	74.22	70.92	63.99	50.13	38.3
1879	46.82	20.86	20.69	33.08	44.29	58.03	64.70	73.16	68.99	57.43	57.43	36.8
1880	46.55	34.06	27.93	31.00	44.39	62.27	67.41	69.39	68.07	59.54	46.69	27.2
1881	47.22	14.93	19.75	29.36	40.53	62.72	63.32	72.95	71.76	67.99	51.87	37.4
1882	47.14	24.32	33.42	34.12	42.65	51.04	64.43	37.84	69.05	61.71	53.53	37.9
1883	48.52	15.78	20.03	24.63	43.00	51.37	64.73	68.36	65.41	57.24	46.73	38.1
1884	44.72	15.14	20.94	28.78	42.00	54.38	67.04	66.70	66.10	64.72	51.56	34.5
1885	42.86	15.46	10.21	19.51	41.39	53.32	63.39	71.13	63.23	59.14	45.78	38.1
1886	44.82	18.72	21.18	30.10	46.04	54.69	63.31	68.68	67.36	61.15	51.84	34.3
1887	44.82	16.58	21.57	25.55	42.09	60.68	66.53	73.22	66.41	57.95	44.46	35.1
1888	45.03	15.93	21.65	25.89	42.81	53.40	68.03	70.95	68.05	58.20	46.01	38.7
1889	47.36	28.18	18.57	35.83	46.04	56.74	63.05	70.69	68.58	61.36	44.59	37.9
1890	46.99	30.06	30.07	27.47	45.23	52.41	69.93	71.29	65.28	58.06	48.88	38.6
1891	47.61	26.90	27.33	28.93	47.11	55.40	67.62	66.67	68.16	65.50	49.01	34.5
1893	45.33	18.72	26.26	28.44	42.50	53.73	66.79	70.87	68.91	61.08	48.87	33.6
1893	54.64	15.23	20.09	30.61	43.19	54.30	69.05	72.16	68.57	60.40	50.59	36.6
1894	48.49	27.19	22.87	38.70	46.90	55.24	70.37	73.30	68.74	64.45	50.14	33.0

EXHIBIT 4.—*Average Temperature by Year and Months, for each of the Years 1879-94, and the Average for the 15 Years, 1879-93, at the Office of the State Board of Health, State Capitol, Lansing, Michigan.*

Years, etc.	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 15 Yrs., '79-93.	47.15	21.79	24.40	30.91	45.94	57.77	67.83	71.97	68.60	61.51	50.08	36.79	28.24
1879	48.87	21.78	22.49	36.27	47.54	60.88	67.71	75.86	70.05	58.11	59.50	38.22	27.46
1880	48.94	36.81	31.62	34.19	47.46	65.48	69.44	71.69	70.38	61.19	48.64	28.78	21.65
1881	49.59	16.98	22.27	30.59	43.23	66.94	65.99	75.41	74.63	71.33	53.63	38.78	35.28
1882	49.23	25.65	35.88	36.14	44.83	53.10	66.86	72.57	71.34	63.64	55.63	39.00	26.13
1883	45.69	17.01	22.07	28.04	46.42	58.28	66.98	70.42	67.78	59.42	48.31	40.09	28.47
1884	47.43	16.48	23.89	32.26	45.30	58.20	70.69	69.77	68.58	67.99	53.47	36.51	26.01
1885	43.01	15.85	10.49	21.57	43.97	55.71	65.26	73.35	63.28	55.86	45.43	38.21	27.14
1886	46.19	19.02	22.44	32.09	50.16	57.77	66.20	70.87	68.49	61.81	51.78	34.02	19.61
1887	46.69	18.26	24.89	27.81	45.27	64.24	69.44	75.76	67.06	58.66	45.19	36.59	27.63
1888	45.49	15.62	22.38	27.49	44.30	58.91	68.80	71.09	67.77	57.79	46.32	39.16	31.19
1889	47.65	29.00	18.89	36.81	46.91	56.99	63.36	70.59	68.46	61.32	44.39	37.71	37.31
1890	47.89	31.63	31.51	28.53	46.86	53.94	71.08	71.81	65.38	57.97	49.09	39.46	27.46
1891	48.27	27.74	29.13	29.59	48.12	56.01	68.27	66.84	68.20	65.87	49.39	34.80	35.23
1892	46.33	19.94	27.91	30.15	44.68	54.91	68.22	71.41	68.59	61.43	49.27	34.11	25.34
1893	46.03	15.09	20.68	32.19	43.98	55.20	69.14	72.14	68.47	60.22	51.19	36.40	27.70
1894	49.00	28.56	22.70	40.48	47.77	56.20	71.04	73.59	67.84	64.21	50.39	33.41	31.78

EXHIBIT 5.—*Average Temperature by Year and Months, for each of the 1864–94, and the Average for the 30 Years, 1864–93, at the Agricultural C Michigan.*

Years, etc.	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
Av. for 30 Yrs., '64-93.	46.44	21.74	23.91	30.73	45.67	57.66	67.58	71.27	68.54	60.31	48.19	35.54
1864	47.32	22.26	27.32	31.74	45.86	60.19	67.62	74.52	70.72	59.62	45.74	37.88
1865	48.12	21.10	27.59	39.96	47.40	57.65	70.76	65.60	65.84	67.66	46.50	38.63
1866	45.60	21.16	22.71	29.60	48.94	55.04	66.60	71.72	62.60	55.80	49.50	37.94
1867	46.91	17.61	30.89	29.72	45.20	51.11	71.61	71.60	69.78	56.60	50.60	40.44
1868	46.34	19.00	18.72	37.80	43.68	59.08	68.46	77.19	70.33	58.77	45.19	36.77
1869	43.27	29.38	26.66	27.60	45.70	56.02	64.45	70.35	70.58	63.45	40.80	32.05
1870	49.11	25.37	24.25	30.28	50.39	64.32	70.87	74.40	70.11	63.66	52.45	38.40
1871	47.93	24.75	25.65	38.18	50.13	61.39	68.21	70.60	71.19	58.10	53.91	31.95
1872	45.54	21.59	21.34	24.75	47.39	58.48	71.82	74.91	71.22	62.08	47.44	29.80
1873	44.54	15.87	19.10	28.30	43.17	56.98	70.60	70.82	69.49	57.38	44.68	28.49
1874	47.05	27.70	25.51	32.30	36.87	59.58	70.61	70.02	69.39	62.85	49.10	35.00
1875	43.06	12.87	7.99	26.20	41.11	60.82	66.57	69.67	65.48	58.50	42.93	32.96
1876	46.17	30.22	27.38	30.55	44.16	57.95	68.14	72.48	71.55	56.30	43.74	36.33
1877	47.42	18.07	32.31	24.51	46.16	58.25	65.93	71.43	68.46	61.28	50.83	35.24
1878	48.29	29.11	28.07	40.90	50.55	54.57	64.08	73.04	70.15	63.15	48.33	36.29
1879	46.88	19.19	20.40	33.19	44.84	58.76	66.02	74.03	70.00	56.21	57.28	38.22
1880	47.32	37.10	29.19	35.50	45.87	64.30	67.60	68.04	68.58	55.83	45.23	27.52
1881	48.78	16.98	21.58	30.28	45.59	65.24	64.31	73.43	72.69	69.69	52.51	38.20
1882	47.57	24.89	35.12	35.96	44.70	52.73	66.49	67.71	69.52	59.98	52.67	36.30
1883	43.52	14.39	19.76	24.89	43.48	52.98	65.87	68.94	64.90	56.43	46.17	38.08
1884	45.66	15.46	23.43	29.89	43.66	56.90	68.92	67.95	66.91	65.06	50.91	34.11
1885	42.90	15.34	8.94	21.26	43.59	55.76	64.69	72.70	63.62	58.94	44.95	37.22
1886	46.20	18.78	22.27	31.33	50.18	58.06	65.72	70.68	69.30	62.07	52.37	33.94
1887	46.60	18.20	24.26	28.29	45.37	64.28	68.53	75.51	67.96	58.86	44.97	35.66
1888	45.03	15.40	21.95	27.03	44.03	58.65	67.89	70.53	67.55	57.76	45.70	38.50
1889	47.33	28.04	18.25	36.51	46.59	57.37	62.88	70.19	68.56	61.24	44.19	37.39
1890	47.60	31.54	31.54	28.15	47.08	53.69	70.40	71.04	65.42	57.76	49.11	39.06
1891	47.38	26.70	26.60	29.30	47.40	55.70	67.40	65.30	67.90	65.10	48.80	33.90
1892	45.88	19.19	27.30	29.86	44.50	54.50	67.70	70.29	68.30	60.80	48.30	34.20
1893	44.98	14.80	21.31	28.16	43.50	54.40	66.60	71.50	68.10	58.41	49.70	35.63
1894	48.58	26.88	21.15	40.06	48.44	56.94	71.38	73.22	68.80	63.66	49.80	32.48

3IT 6.—*Statements of Meteorological Conditions in the year and in each month e year 1894, compared with the annual and monthly averages for 1893, and for al stated periods of years. These statements and averages are for* **Groups veral Stations in Michigan.**

rological ditions.	1894 Compared with Averages for Previous Years.		In 1894 More (+), or Less (-), than in 1893.	Meteorological Conditions.	1894 Compared with Averages for Previous Years.		In 1894 More (+), or Less (-), than in 1893.
	No. of Years Averaged, end'g with 1893.	More (+), or Less (-), in 1894 than the Average for Previous Years.			No. of Years Averaged, end'g with 1893.	More (+), or Less (-), in 1894 than the Average for Previous Years.	
R 1894.				YEAR 1894.			
p.	17	+2.38°	+2.85°	*Continued.*			
f Temp.*	17	+3°	+5°	Cloudiness	17	—2 per ct.	=
nthly Range p.*	17	+4°	+5°	Rainfall	17	—6.73 in.	—7.60 in.
ly Range of *	15	—.17°	—.08°	Atmospheric Pressure	17	—.089 in.	—.007 in.
NUARY.				FEBRUARY.			
p.	17	+6.18°	+11.96°	Av. Temp.	17	—1.26°	+2.28°
f Temp.*	17	=	=	Range of Temp.*	17	+5°	+13°
ly Range of *	15	—1.39°	—.60°	Av. Daily Range of Temp.*	15	—.43°	—1.80°
ess	17	—2 per ct.	—8 per ct.	Cloudiness	17	—8 per ct.	—8 per ct.
l	17	—.46 in.	—.57 in.	Rainfall	17	—.93 in.	—1.13 in.
heric Pres-	17	—.087 in.	+.099 in.	Atmospheric Pressure	17	—.063 in.	—.037 in.
ARCH.				APRIL.			
p.	17	+9.25°	+8.09°	Av. Temp.	17	+2.65°	+3.71°
f Temp.*	17	+12°	+9°	Range of Temp.*	17	+1°	+5°
ly Range of *	15	—.77°	+.01°	Av. Daily Range of Temp.*	15	—1.34°	+1.54°
ess	17	—3 per ct.	—1 per ct.	Cloudiness	17	+2 per ct.	—14 per ct.
l	17	—.18 in.	—.31 in.	Rainfall	17	—.14 in.	—2.31 in.
heric Pres-	17	—.096 in.	—.025 in.	Atmospheric Pressure	17	—.059 in.	+.064 in.
MAY.				JUNE.			
p.	17	—.49°	+.94°	Av. Temp.	17	+4.87°	+1.32°
f Temp.*	17	—2°	+3°	Range of Temp.*	17	+3°	+5°
ly Range of *	15	—2.07°	—1.00°	Av. Daily Range of Temp.*	15	+2.38°	+2.22°
ess	17	+10 per ct.	+10 per ct.	Cloudiness	17	—7 per ct.	+7 per ct.
l	17	+3.06 in.	+3.61 in.	Rainfall	17	—1.15 in.	—.79 in.
heric Pres-	17	—.104 in.	+.013 in.	Atmospheric Pressure	17	—.060 in.	—.031 in.

istering thermometers.
nts on Exhibit 6 are printed on page 11.
h temperature for January and March, and the small amount of rainfall for the year 1894, are noticeable.

EXHIBIT 6.—CONTINUED.—*Meteorological Conditions at stations in Michigan, for months for the year 1894, compared with averages for corresponding months for preceding years.*

Meteorological Conditions.	1894 Compared with Averages for Previous Years.		In 1894 More (+), or Less (-), than in 1893.	Meteorological Conditions.	1894 Compared with Averages for Previous Years.		In 1894 More (+), or Less (-), than in 1893.
	No. of Years Averaged, end'g with 1893.	More (+), or Less (-), in 1894 than the Average for Previous Years.			No. of Years Averaged, end'g with 1893.	More (+), or Less (-), in 1894 than the Average for Previous Years.	
JULY.				AUGUST.			
Av. Temp.	17	+2.65°	+1.14°	Av. Temp.	17	+.78°	+.17°
Range of Temp.*	17	+7°	+12°	Range of Temp.*	17	+7°	+8°
Av. Daily Range of Temp.*	15	+2.27°	+2.40°	Av. Daily Range of Temp.*	15	+2.94°	+1.04°
Cloudiness	17	—11 per ct.	—9 per ct.	Cloudiness	17	+1 per ct.	+13 per ct.
Rainfall	17	—1.81 in.	—1.53 in.	Rainfall	17	—2.41 in.	—.50 in.
Atmospheric Pressure	17	—.054 in.	—.014 in.	Atmospheric Pressure	17	—.060 in.	—.029 in.
SEPTEMBER.				OCTOBER.			
Av. Temp.	17	+3.33°	+4.05°	Av. Temp.	17	+.65°	—.45°
Range of Temp.*	17	+6°	+3°	Range of Temp.*	17	—4°	—2°
Av. Daily Range of Temp.*	15	+.50°	+.17°	Av. Daily Range of Temp.*	15	—1.43°	—1.51°
Cloudiness	17	—3 per ct.	—2 per ct.	Cloudiness	17	+7 per ct.	+17 per ct.
Rainfall	17	+.02 in.	+.61 in.	Rainfall	17	—.48 in.	—1.48 in.
Atmospheric Pressure	17	—.093 in.	+.003 in.	Atmospheric Pressure	17	—.204 in.	—.116 in.
NOVEMBER.				DECEMBER.			
Av. Temp.	17	—3.12°	—3.52°	Av. Temp.	17	+3.59°	+4.52°
Range of Temp.*	17	+7°	+12°	Range of Temp.*	17	+12°	+3°
Av. Daily Range of Temp.*	15	—1.54°	—1.69°	Av. Daily Range of Temp.*	15	—1.19°	—2.23°
Cloudiness	17	+4 per ct.	+8 per ct.	Cloudiness	17	—12 per ct.	—17 per ct.
Rainfall	17	—1.15 in.	—1.03 in.	Rainfall	17	—1.11 in.	—2.19 in.
Atmospheric Pressure	17	—.092 in.	+.001 in.	Atmospheric Pressure	17	—.069 in.	—.011 in.

*By registering thermometers.

T 7.—*Statements of Meteorological Conditions in the year and in each month ear 1894, compared with annual and monthly averages for 1893, and for stated periods of years—from observations by Prof. R. C. Kedzie,* **at the gricultural College, near Lansing, Michigan.**

ogical ions.	1894 Compared with Averages for Previous Years.		In 1894 More (+), or Less (-), than in 1893.	Meteorological Conditions.	1894 Compared with Averages for Previous Years.		In 1894 More (+), or Less (-), than in 1893.
	No. of Years Averaged, end'g with 1893.	More (+), or Less (-), in 1894 than the Average for Previous Years.			No. of Years Averaged, end'g with 1893.	More (+), or Less (-), in 1894 than the Average for Previous Years.	
1894.				YEAR 1894.			
----------	30	+2.14°	+3 60°	*Continued.*			
'emp.*....	21	+8°	+9°	Cloudiness.....	30	—2 per ct.	+1 per ct.
ly Range ----------	21	+8°	+7°	Rainfall	30	—12.10 in.	—11.99 in.
Range of ----------	20	+2.33°	+1.38°	Atmospheric Pressure	19	—.030 in.	+.019 in.
ARY.				FEBRUARY.			
----------	30	+5.14°	+12.08°	Av. Temp.....	30	—2.76°	—.16°
emp.*....	21	+11°	+9°	Range of Temp.*....	21	+5°	+11°
Range of ----------	20	+7.60°	+2.22°	Av. Daily Range of Temp.*	20	+1.01°	+.42°
----------	30	—8 per ct.	—14 per ct.	Cloudiness.....	30	—8 per ct.	—8 per ct.
----------	30	—.43 in.	—.41 in.	Rainfall	30	—1.51 in.	—1.30 in.
ic Pres- ----------	19	—.088 in.	—.006 in.	Atmospheric Pressure	19	—.060 in.	—.086 in.
H.				APRIL.			
----------	30	+9.33°	+11.90°	Av. Temp.....	30	+2.77°	+4.94°
emp.*....	21	+7°	+8°	Range of Temp.*....	21	—1°	+4°
Range of ----------	20	—1.28°	—1.99°	Av. Daily Range of Temp.*	20	—1.41°	+4.60°
----------	30	+2 per ct.	+6 per ct.	Cloudiness.....	30	+5 per ct.	—10 per ct.
----------	30	—1.17 in.	—1.57 in.	Rainfall	30	+.33 in.	—2.05 in.
ic Pres- ----------	19	—.031 in.	—.042 in.	Atmospheric Pressure	19	+.013 in.	+.090 in.
:				JUNE.			
----------	30	—.72°	+2.54°	Av. Temp.....	30	+3.80°	+4.78°
emp.*....	21	—1°	+5°	Range of Temp.*...	21	+12°	+23°
Range of ----------	20	—2.11°	+2 39°	Av. Daily Range of Temp.*	20	+7.33°	+7.90°
----------	30	+11 per ct.	+10 per ct.	Cloudiness.....	30	—8 per ct.	+2 per ct.
----------	30	+1.61 in.	+1.97 in.	Rainfall	30	—2.78 in.	—3.55 in.
ic Pres- ----------	19	—.045 in.	+.016 in.	Atmospheric Pressure	19	—.002 in.	—.040 in.

uring thermometers.
on Exhibit 7 are printed on page 11.
mperature for January and March, and the small amount of rainfall for the year 1894, are ticeable.

EXHIBIT 7.—CONTINUED.—*Meteorological Conditions at the Agricultural College for months, for the year 1894, compared with averages for corresponding months for preceding years.*

Meteorological Conditions.	1894 Compared with Averages for Previous Years.		In 1894 More (+), or Less (-), than in 1893.	Meteorological Conditions.	1894 Compared with Averages for Previous Years.		In 1893 More (+), or Less (-), than in 1893.
	No. of Years Averaged, end'g with 1893.	More (+), or Less (-), in 1894 than the Average for Previous Years.			No. of Years Averaged, end'g with 1893.	More (+), or Less (-), in 1894 than the Average for Previous Years.	
JULY.				AUGUST.			
Av. Temp.	30	+1.95°	+1.72°	Av. Temp.	30	+.26°	+.70°
Range of Temp.*	21	+18°	+19°	Range of Temp.*	21	+24°	+20°
Av. Daily Range of Temp.*	20	+10.29°	+9.07°	Av. Daily Range of Temp.*	20	+8.93°	+4.59°
Cloudiness	30	—15 per ct.	—10 per ct.	Cloudiness	30	—8 per ct.	+10 per ct.
Rainfall	30	—2.26 in.	—1.00 in.	Rainfall	30	—2 80 in.	—.56 in.
Atmospheric Pressure	19	—.004 in.	+.008 in.	Atmospheric Pressure	19	—.001 in.	+.021 in.
SEPTEMBER.				OCTOBER.			
Av. Temp.	30	+3.35°	+5.25°	Av. Temp.	30	+1.61°	+.10°
Range of Temp.*	21	+14°	+8°	Range of Temp.*	21	+3°	—2°
Av. Daily Range of Temp.*	20	+2.15°	—2.33°	Av. Daily Range of Temp.*	20	+1.21°	—1.83°
Cloudiness	30	—2 per ct.	+3 per ct.	Cloudiness	30	+9 per ct.	+22 per ct.
Rainfall	30	—.20 in.	+.75 in.	Rainfall	30	—.61 in.	—1.70 in.
Atmospheric Pressure	19	—.012 in.	+.123 in.	Atmospheric Pressure	19	—.099 in.	+.015 in.
NOVEMBER.				DECEMBER.			
Av. Temp.	30	—3.06°	—3.15°	Av. Temp.	30	+3.76°	+2.52°
Range of Temp.*	21	+1°	—4°	Range of Temp.*	21	+6°	—7°
Av. Daily Range of Temp.*	20	—1.11°	—5.43°	Av. Daily Range of Temp.*	20	+.36°	—3.06°
Cloudiness	30	+7 per ct.	+12 per ct.	Cloudiness	30	—7 per ct.	—11 per ct.
Rainfall	30	—1.33 in.	—1.22 in.	Rainfall	30	—.98 in.	—1.35 in.
Atmospheric Pressure	19	—.022 in.	+.071 in.	Atmospheric Pressure	19	—.008 in.	+.104 in.

* By registering thermometers.

METEOROLOGICAL CHARACTERISTICS OF THE YEAR 1894 IN MICHIGAN.

At the several meteorological stations, in different parts of the State, the average temperature for 1894 was 2.38° higher than the average for the preceding 17 years; the annual range of temperature was 5° greater than in 1893, and 3° greater than the annual average range for the preceding 17 years; the average monthly range of temperature was 5° greater than in 1893, and 4° greater than the average for the preceding 17 years; the average daily range of temperature was .08° less than in 1893, and .17° less than the average for the preceding 15 years; the average cloudiness was the same as in 1893, and 2 per cent less than the average for the preceding 17 years; the rainfall (rain and melted snow) was 7.60 inches less than in 1893, and 6.72 inches less than the average for the preceding 17 years; the average atmospheric pressure was .007 of an inch less than in 1893, and .089 inches less than the average for the preceding 17 years.

In Exhibit 6, pages 7 and 8, is given by year and months, a comparison of conditions in 1894, in Michigan, with those in 1893, and with the averages for periods of years. March, January, June, December, September, April, July, August, and October (naming the months in order of greatest difference) were the months in which the average temperature in 1894 was higher than the average for corresponding months in the preceding 17 years; November, February and May were months in which the average temperature in 1894 was lower than the average for corresponding months in the preceding 16 years.

METEOROLOGICAL CHARACTERISTICS OF THE YEAR 1894, AT ONE CENTRAL STATION.

At the State Agricultural College, near Lansing, and near the center of the thickly-settled part of the State, the average temperature for 1894 was 3.60° higher than in 1893, and 2.14° higher than the average for the preceding 30 years; the annual range of temperature was 9° greater than in 1893, and 8° greater than the average for the preceding 21 years; the average monthly range of temperature was 7° greater than in 1893 and 8° greater than the average for the preceding 21 years; the average daily range of temperature was 1.38° greater than in 1893, and 2.33° greater than the average for the preceding 20 years; the average cloudiness was 1 per cent greater than in 1892, and 2 per cent less than the average for the preceding 30 years; the rainfall (rain and melted snow) was 11.99 inches less than in 1893, and 12.10 inches less than the average for the preceding 30 years; the average atmospheric pressure was .019 of an inch less than in 1893, and .030 of an inch less than the average for the preceding 20 years.

In exhibit 7, pages 9 and 10, is given by year and months, a comparison of conditions in 1894, at the Agricultural College, with those in 1893, and with averages for periods of years. March, January, June, December, September, April, July, October, and August (naming months in order of greatest difference) were months in which the average temperature in 1894 was higher than the average for corresponding months in the preceding 30 years; November, February and May were months in which the average temperature in 1894 was lower than the average for

corresponding months in the preceding 30 years, at that station which is near the central part of the State.

Whoever will carefully study Diagram No. 1 (p. 20) in this article, and in similar articles for preceding years, will see that thermometers and methods of observation have become so perfect that, given a curve representing correctly the temperature by months at one station in Michigan, curves can readily be constructed without actual records, which will somewhat closely represent the temperature at each of several other stations, because the curves for many stations run so nearly parallel that all that is necessary to do is to find the average difference of mean annual temperature at the station to be represented compared with the station for which the data are given. It may also be seen that a curve representing the temperature at a station in the central part of the State very closely resembles the curve representing the average for many stations representing nearly all parts of the State. This proves that the practice adopted many years ago of stating the meteorological characteristics at one central station is a reasonably safe practice, and it is especially useful when it enables us to gain a comparison for a longer period than can be made from records at many stations, and also when employed in advance of the receipt of records from all stations, as is the case when the weekly bulletins of "Health in Michigan" are issued, for the purposes for which the meteorological conditions at the State Capitol are used to represent the conditions probably prevailing throughout the State.

LOCAL METEOROLOGICAL PHENOMENA IN THE SEVERAL MONTHS OF THE YEAR 1894.

The following general remarks relative to temperature, frosts, effects on vegetation, migration of birds, etc., in 1894, are taken from the monthly reports by observers. The names of stations are appended; the names of observers are stated in Exhibit 1, page 2.

JANUARY.

Depth of snow on ground, Jan. 15, 30.5 inches; Jan. 31, 30.5 inches.—*Marquette.*

Melting snow on ground, Jan. 5, 6, 29. Ground frozen to depth of 3½ inches, Jan. 31. Month warmer than usual with frequent sudden changes.—*Grand Haven.*

Nights that did not freeze, Jan. 3, 14, 15, 16, 17, 20. A mild winter month, with a few storms and much sunshiny weather. The light snowfall made, after Jan. 24, some indifferent sleighing.—*Thornville.*

Grand River opened, second time, Jan. 3; closed third time, Jan. 9; opened third time, Jan. 18; closed fourth time, Jan. 25. Frosts, Jan. 9, 10, 19. Good sleighing, Jan. 24, 25, 26, 27, 28, 29, 30, 31. No snow on ground, Jan. 15. Depth of snow on ground, Jan. 31, 6 inches.—*Lansing.*

No snow on ground, Jan. 15. Depth of snow on ground, Jan. 31, 3 inches.—*Adrian.*

Ground bare till Jan. 23. Snowfall for Jan. (6.50 inches) is the least for 14 years, with one exception, that of 1891, which was only 5 inches.—*Parkville.*

No snow on ground Jan. 15. Average depth, Jan. 31, .3 of an inch.—*Detroit.*

FEBRUARY.

Depth of snow on ground, Feb. 15, 36.7 inches; Jan. 31, 30.7 inches.—*Marquette.*

Depth of snow on ground, Feb. 15, 6 inches. Very little snow on ground Jan. 31.—*Harrisville.*

Melting snow on ground, Feb. 1, 2, 6, 7, 8, 9, 17, 26.—*Grand Haven.*

Snow on ground, Feb. 1, 2, 3, 4, 5, 6, 7, 8, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28.—*Port Huron.*

Colder month than Jan. Much bright weather—some heavy storms. The snow made poor sleighing.—*Thornville.*

Bees out, Feb. 28. Ground covered with snow from Feb. 12 to Feb. 28.—*Parkville.*

Frosts, Feb. 1, 5, 6, 14, 25, 26, 28. Melting snow on ground, Feb. 6, 7, 8, 9. Depth of snow on ground, Feb. 14, 7 inches and drifted; Feb. 28, patches of snow, where it had been drifted.—*Lansing.*

Depth of snow on ground, Feb. 15, 7.5 inches; Feb. 28, 3 inches.—*Adrian.*

Average depth of snow on ground, Feb. 15, 14.1 inches, Feb. 28, trace.—*Detroit.*

MARCH.

Navigation on Lake Huron opened, March 11; on St. Clair River, March 15. Days with snow on ground, March 1, 2, 3, 15, 27, 28, 29.—*Port Huron.*

Nights that did not freeze, Mar. 4, 5, 10, 12, 17, 18, 30. Frogs first heard, Mar. 11. Robins return, Mar. 4; Bluebirds, Mar. 5; Song sparrows, Mar. 8; Blackbirds, Mar. 9; Meadow lark, Mar. 11; Phœbe bird, Mar. 20. March was a very dry month and unusually warm and pleasant. There was no sleighing and little mud. Wheat looks extremely well but needs rain. There is little seeding left. Peach buds are killed.—*Thornville.*

Depth of snow on ground, Mar. 15, ½ inch. Mar. 31, no snow.—*Adrian.*

Frosts, light, Mar. 10, 12. Killing, Mar. 2, 3, 7, 8, 24. Grand River opened, March 4. Bluebirds, robins and Meadow larks appeared March 4; blackbirds, Mar. 5. Frost out of ground, Mar. 7. First grasshopper appeared, Mar. 16. Hyacinth budded, Mar. 10. Lilacs and early roses leafing, Mar. 13. Soft maple budded, Mar. 15. Farmers commenced plowing, Mar. 16. Ground frozen, morning of Mar. 24.—*Lansing.*

Bees were out nearly all the month. Wild geese seen, Mar. 3; frogs, Mar. 4; Spring birds, Mar. 9.—*Parkville.*

APRIL.

Navigation opened, Apr. 30. No snow on ground, April 15 and 30.—*Marquette.*

Killing frost, Apr. 25.—*Sault Ste. Marie.*

Melting snow on ground, Apr. 7, 18, 11.—*Port Huron.*

Nights that did not freeze, Apr. 3, 4, 13, 17, 25, 26. Soft maple blossoming, Apr. 16. Tamaracks leafing, Apr. 18. Apple leafing, Apr. 24; Juneberry blossoming, Apr. 26. Plums, Peaches and Cherries blossoming, Apr. 29. Yellow-birds return, Apr. 21.—*Thornville.*

Light frosts, Apr. 24, 25, 26. Killing frosts, Apr. 1, 2, 6, 8, 9, 12. Ground frozen, Apr. 2, 6, 8, 9, 12. Plum trees in bloom Apr. 19. Cherry trees in bloom, Apr. 23. Began mowing Capitol lawn, Apr. 24.—*Lansing.*

Frosts, Apr. 25. Ice formed, Apr. 1, 2, 6, 8, 9, 12, 13, 24.—*Parkville.*

MAY.

Light frost, May 4. Killing frost, May 9.—*Sault Ste. Marie.*

Killing frost, May 28.—*Grand Haven.*

Killing frost, May 29.—*Port Huron.*

Light frosts, May 9, 24. Killing frosts, May 28, 29. A cool wet May—the latter part colder than the first. Wheat looking well. Corn backward on account of the cold weather. Grass very unpromising. Oats are good so far and prospects for all kinds of fruit flattering. Yellow oak and soft maple leafing, May 4. White oak leafing, May 16. Locust leafing, May 18. Catbird heard, May 1. Oriole seen, May 2. Bobolink seen, May 8.—*Thornville.*

Snow fell sufficient to cover roofs of buildings, May 19. Light frost, May 28.—*Lansing.*

A few snowflakes, May 19. Heavy frost on low ground, May 28.—*Ann Arbor.*

Ice formed, ⅛ inch thick. May 28. Grape vines and potato tops injured.—*Parkville.*

JUNE.

Light frost, June 19.—*Marquette.*

Killing frost, June 6.—*Port Huron.*

Frost, June 6. Wheat heading, June 6. Locust trees in blossom, June 7. First day of real corn weather, June 8. Oats heading, June 24. A dry, hot month, with only one cloudy day, very favorable for work and not bad for the growth of crops.—*Thornville.*

Frost, June 6.—*Detroit.*

JULY.

The month was one of the worst droughts ever known. There were heavy rains July 10 and 20, but the moisture lasted only three or four days. Of the secured crops, wheat is good, hay a failure. The growing crops are suffering for want of rain.—*Thornville.*

Very little dew throughout the whole month. Vegetation and ground became parched quicker than I ever saw it before. Temperature of the surface of plowed ground, 130 degrees.—*Parkville.*

AUGUST.

The month was a continuation of the July drought. Hay and all spring crops are a failure. Pasturage is all burned up, except marshes, and plowing is almost impossible. The dust and smoke are very disagreeable. Light frosts, Aug. 16, 21, killed potatoes in low places.—*Thornville.*

Frost reported as having damaged corn and tender vegetables near this station, on low ground, Aug. 3, first of season.—*Lansing.*

SEPTEMBER.

Severe droughts.—*Parkville.*

Frost, Sept. 10.—*Rockland.*

Killing frosts, Sept. 18, 25.—*Marquette.*

Light frosts, first of season, Sept. 25.—*Grand Haven.*

Light frosts, Sept. 25, 26.—*Port Huron.*

Light frosts, Sept. 25, 26, did some damage on low ground. Barn swallows gone by the first; song sparrows by the 21st. Bluebirds going, Sept. 22. The July and August drought was broken by copious rains in the fore part of the month, but as it closes it is very dry again. Wheat is slow coming up and seeding is late. Corn and beans ripened early. All crops are very poor except wheat.—*Thornville.*

Light frost, Sept. 19. Killing frosts, Sept. 25, 26 on low ground.—*Lansing.*

Light frosts, Sept. 17, 27. Heavy frosts, Sept. 25, 26.—*Ann Arbor.*

Frost, Sept. 24.—*Battle Creek.*

Light frost, Sept. 25, 26.—*Parkville.*

Frost, Sept. 12, 25.—*Detroit.*

OCTOBER.

Killing frost, Oct. 9.—*Marquette.*

Killing frost, Oct. 24.—*Sault Ste. Marie.*

Light frosts, Oct. 1, 14. Killing frost, first of season, Oct. 15.—*Grand Haven.*

Killing frost, first of season, Oct. 1. First black frost of season Oct. 14.—*Port Huron.*

Nights that did not freeze, Oct. 1, 2, 3, 4, 7, 8, 12, 16, 18, 19, 22, 23, 25, 27, 28, 29. First killing frosts, Oct. 13, 14. Wild geese going south, about Oct. 12. As the month closes, the soil is very dry below in spite of the very considerable rainfall. Water in streams and swamps is low. It has been an extremely healthy month—notably so. The top on the wheat and young seeding is poor. Corn is generally small owing to the droughty summer. Oats light and very smutty. Potatoes were caught in the freeze and rot some.—*Thornville.*

Light frost, Oct. 25. Killing frosts, Oct. 1, 11, 13, 14, 15, 18. Ground froze and ice formed, nights of Oct. 11, 14; first of season.—*Lansing.*

Frost, Oct. 1, 6, 12, 18, 27.—*Ann Arbor.*

Frosts, Oct. 1, 13, 14, 17.—*Battle Creek.*

Wild geese seen Oct. 9. Ice formed, Oct. 1, 14, 15.—*Parkville.*

Light frost, Oct. 11. Killing frost, Oct. 14.—*Detroit.*

NOVEMBER.

Depth of snow on ground, Nov. 15, 2.7 inches; Nov. 30, 8.4 inches.—*Marquette.*

Melting snow on ground, Nov. 5, 6, 8, 9, 10, 11, 13, 14, 15, 16, 20.—*Grand Haven.*

First snow of the season, Nov. 6.—*Port Huron.*

Snow began to fall, Nov. 7, laid till Nov. 15. Ground bare after that. A rather cold dry month, bad for wheat, the most of which has very small top. Water is getting very low; swamps and marshes being dry. Wells failing. There is no moisture in the earth 18 inches below the surface.—*Thornville.*

Observer picked a dandelion blossom, Nov. 1. Killing frosts, Nov. 6, 18, 24, 25. First snow of season, Nov. 5. Ground froze, Nov. 6. Wild geese flying south Nov. 5. Ice formed in Grand River, first time of season, Nov. 11. Farmers plowing near this station, Nov. 15. Grand River closed, first time of season, Nov. 20. Grand River clear of ice, Nov. 23. Grand River closed, second time, Nov. 28. No snow on ground, Nov. 15 and 30.—*Lansing.*

Depth of snow on ground 1¼ inches, Nov. 15.—*Adrian.*

Heavy frosts, Nov. 5, 6, 18. Ground froze, Nov. 18-30. Melting snow on ground, Nov. 7, 8, 9, 10, 11, 12 13, 14, 15.—*Albion.*

Frosts, Nov. 6, 11.—*Battle Creek.*

Winter set in, on Nov. 7.—*Parkville.*

DECEMBER.

Navigation closed, Dec. 4. Depth of snow on ground 3.1 inches, Dec. 15; 8.3 inches, Dec. 31.—*Marquette.*

Black River frozen over, Dec. 27. Ice began floating in Lake Huron and St. Clair river, Dec. 27. Navigation on Lake Huron closed, Dec. 19.—*Port Huron.*

Nights that did not freeze, Dec. 6, 7, 15, 20. A very dry month with much warm pleasant cloudless weather for the season. The mean temperature of the month is about 5° above the normal. The last week was severe winter, the frost in the ground being more than a foot. Water is very low, swamps and marshes dry, and stoned up wells are generally failing. In spite of the dry weather wheat on the ground seems to look better than could be expected.—*Thornville.*

Killing frosts, Dec. 4, 5, 6, 10, 14, 18, 19, 20, 23, 26. Grand River open, Dec. 8; closed, Dec. 26. Farmers plowing near this station, Dec. 8. First skating on Grand River, of season, Dec. 28. No snow on ground, and no frost in ground, Dec. 15. No snow on ground, Dec. 31.—*Lansing.*

Bees were out, Dec. 8, 21.—*Parkville.*

MEASUREMENTS AND TEMPERATURE OF GROUND WATER.

In a paper entitled "Typhoid Fever and Low Water in Wells," on pages 89-114 of the Annual Report of this Office for 1884, it is shown that for the years 1878-82 there was a relation between the sickness and deaths from typhoid fever in Michigan and the depth of water in wells. In the month of October, when the water in wells reached the lowest point in the year, there were the most deaths and sickness from typhoid fever; and following the month of April, when the water in wells was highest, there were the least deaths and sickness from typhoid fever. When this comparison is made in a diagram, it is found that, "beginning with June in each year the curve representing sickness from typhoid fever follows more or less closely the curve representing the average depth of earth above the ground water."

On page 256, of the Report of this Board for the year 1889, is a diagram exhibiting the relation of tpyhoid fever to low water in wells, in Michigan, for the 10 years, 1878 and 1880-88.

On page 229 of the Report for 1891 also on page 226 of the Report for 1892, is a diagram exhibiting the relation of typhoid fever to low water in wells, in Michigan, for the twelve years, 1878 and 1880-90.

On page 271 of the Report for 1893 and on page 300 of the Report for 1894, is a diagram exhibiting the relation of typhoid fever to low water in wells, in Michigan, for the fourteen years, 1878 and 1880-92.

Typhoid fever being one of the most important causes of death in Michigan, it is of very great importance that further evidence be collected on this important subject.

The measurements for each month in 1894, of the depth of a well at each of seven places in Michigan, are shown in Exhibit 8; also the depth of earth above the water, and the temperature of the water in each of the wells. It is hoped that these measurements and observations may continue, and permit a more extended comparison of the depth of water in wells with the sickness from typhoid fever, and with sickness and deaths from other diseases.

CHANGE OF EXPOSURE OF INSTRUMENTS AT LANSING IN 1884.

Comments on the subject of a new instrument shelter at Lansing are printed on page 21, Report for 1885. Exhibits A, B, C, and D, pages 22 and 23, of the Report for 1886, relate to that subject, and may be studied in connection with what is said on page 21, Report for 1885. The fact of the change of place of observation in 1884 may need to be taken into account by whoever studies the meteorology at Lansing through a long series of years.

EXHIBIT 8.—*Depth of Wells; Depth of Ground above Water in Well; Temperature of water in Well, and day of observation of such temperature, in each month of the year 1894, as reported by Meteorological observers for the State Board of Health, and for the United States Weather Bureau.*

Stations in Michigan.	January.			February.			March.			April.			May.			June.		
	Depth of Well.—Ft., In.	Depth of Ground above Water in Well.—Ft., In.	Temp. of Water in Well. —Deg. F.	Depth of Well.—Ft., In.	Depth of Ground above Water in Well.—Ft., In.	Temp. of Water in Well. —Deg. F.	Depth of Well.—Ft., In.	Depth of Ground above Water in Well.—Ft., In.	Temp. of Water in Well. —Deg. F.	Depth of Well.—Ft., In.	Depth of Ground above Water in Well.—Ft., In.	Temp. of Water in Well. —Deg. F.	Depth of Well.—Ft., In.	Depth of Ground above Water in Well.—Ft., In.	Temp. of Water in Well. —Deg. F.	Depth of Well.—Ft., In.	Depth of Ground above Water in Well.—Ft., In.	Temp. of Water in Well. —Deg. F.
Traverse City*	55	40 4	47^{23}	55	40 2	47^{22}	55	39 10	48^{22}	55	38 5	47^{26}	55	39 4	48^{21}	55	39 10	48^{29}
Lansing, S. B. of H.	26 11½	24 6½	51^{16}	26 11½	24 5¼	50^{14}	26 11½	24 3¾	49^{16}	26 11½	24 3½	49^{16}	26 11½	24 1¼	49^{17}	26 11½	23 10½	49^{15}
Ann Arbor	17	12 6	44^{16}	17	11 7	42^{18}	17	10 4½	41^{17}	17	11 5	46^{17}	17	9 4	48^{16}	47	10 8	49^{16}
Battle Creek	60 8	58 8	47^{18}	59	53 8	47^{18}	59 7	54 3	 ^{18}	41 4	38 4	58^{24}	42 8	38 8	52^{17}	65	62	47^{17}
Kalamazoo	25	15	48^{15}	25	15	48^{15}	25	15	47^{16}	25	15	47^{16}	25	15	50^{16}	25	15	51^{16}
River Raisin †	23	17	48^{15}	23	16	48^{15}	23	16 6	48^{15}	23	16	48^{16}	23	16	48^{15}	23	17	48^{15}
Hillsdale	30 6	24	49^{15}	30 6	23 10	50^{15}	30 6	21 6	50^{15}	30 6	21 10½	50^{15}	30 6	21	50^{15}	30 6	21	50^{15}

NOTE.—The small figures above and at the right of the numbers denoting the degrees of temperature, state the day of the month on which the observation was made.
* At Northern Michigan Asylum, W. H. Bauld, observer.
† D. W. Palmer, observer.

EXHIBIT 8.—*Depth of Wells, etc.*—CONTINUED.

Stations in Michigan.	July.			August.			September.			October.			November.			December.		
	Depth of Well.—Ft., In.	Depth of Ground above Water in Well.—Ft., In.	Temp. of Water in Well. —Deg. F.	Depth of Well.—Ft., In.	Depth of Ground above Water in Well.—Ft., In.	Temp. of Water in Well. —Deg. F.	Depth of Well.—Ft., In.	Depth of Ground above Water in Well.—Ft., In.	Temp. of Water in Well. —Deg. F.	Depth of Well.—Ft., In.	Depth of Ground above Water in Well.—Ft., In.	Temp. of Water in Well. —Deg. F.	Depth of Well.—Ft., In.	Depth of Ground above Water in Well.—Ft., In.	Temp. of Water in Well. —Deg. F.	Depth of Well.—Ft., In.	Depth of Ground above Water in Well.—Ft., In.	Temp. of Water in Well. —Deg. F.
Traverse City*	55	40	47^{21}	55	40 4	47^{31}	55	41 8	47^{20}	55	41 4	47^{22}	------	------	------	55	41	47^{22}
Lansing, S. B. of H.	26 11½	24 4⅜	50^{16}	26 11½	24 8	50^{16}	26 11½	24 11⅜	52^{15}	26 11⅜	25 5	52^{16}	26 11½	26 1¾	53^{17}	26 11⅜	26¼	52^{15}
Ann Arbor	17	12	52^{16}	17	12 11	54^{16}	17	13 6	55^{16}	17	14	55^{19}	17	14 3	48^{18}	17	14 5	49^{15}
Battle Creek	55	52	50^{31}	50	48	47^{22}	50	47 6	49^{20}	50 2	44 7	42^{21}	50 5	47 11	47^{19}	50 5	49 2	50^{20}
Kalamazoo	25	15	52^{16}	25	15	51^{15}	25	15	51^{15}	25	15	50^{15}	25	15	50^{15}	25	15	48^{15}
River Raisin†	23	17	48^{15}	23	17	48^{15}	23	16 6	48^{15}	23	16	48^{15}	23	17	48^{15}	23	16 6	48^{15}
Hillsdale	30 6	21 11	50^{15}	30 6	23	50^{16}	30 6	24 1	51^{15}	30 6	25 4	15^{15}	30 6	26 4	50^{15}	30 6	26 7	50^{15}

NOTE.—The small figures above and at the right of the numbers denoting the degrees of temperature, state the day of the month on which the observation was made.
* At Northern Michigan Asylum, W. H. Bauld, observer.
† D. W. Palmer, observer.

TEMPERATURE OF THE ATMOSPHERE.

Compared with the average for the preceding 30 years at the Agricultural College, the temperature for March was high. A comparison, by months in the preceding 30 years, 1864–93, at the Agricultural College, near Lansing, is given in Exhibit 10, page 19.

The average temperature, by months, for the 15 years, 1879–93, at Lansing, and a comparison of 1894, by months, with that average, are stated in Exhibit 11.

The average temperatures at each of 13 stations in Michigan, and the average for 11 stations in 1894, and in each month of that year, are stated in Table I., page 21.

EXHIBIT 9.—*Average Temperature by Year and months in 1894,* compared with Annual and Monthly Averages for 1893, and for the 17 years, 1877–93. These Averages are for Groups of Several Stations in Michigan.*

Years, etc.	Average Temperature—Degrees Fahr.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 17 years, 1877–93.	46.11	21.01	23.63	29.45	44.25	55.73	66.00	70.65	67.96	61.13	49.46	36.21	27.81
Av. 15 years, 1879–93.	45.73	20.72	22.65	28.89	43.55	55.63	65.96	70.27	67.60	60.76	49.19	35.98	27.56
1893 (9 stations).....	45.64	15.23	20.09	30.61	43.19	54.30	69.05	72.16	68.57	60.40	50.59	36.61	26.85
1894 (11 stations)...	48.49	27.19	22.37	38.70	46.90	55.24	70.37	73.30	68.74	64.45	50.14	33.09	31.40
In 1894 Higher than Av. for 17 years, 1877–93	2.38	6.18		9.25	2.65		4.37	2.65	.78	3.32	.68		3.59
In 1894 Lower than Av. for 17 years, 1877–93			1.26			.49						3.12	

NOTE.—The stations represented in the lines for average temperature for the years 1877–90 in Exhibit 9, are the following: Port Austin for 1885, 1888, 1889; Mendon for 1877–82; Nirvana for 1877–79 and first four months of 1880; Reed City for last eight months of 1880 and 1881–85; Kalamazoo for 1877–89; Coldwater, Ypsilanti, Woodmere Cemetery (near Detroit), for 1877–79; Otisville for 1878–80, 1882; Niles for 1878–79, 1881; Washington for 1879–83; Benton Harbor for 1877–78; Petoskey for 1878–79; Parkville for 1881–82; Hillsdale for 1882–84; Winfield for 1881–1883; Mallory Lake for first seven months of 1881, Hudson for last five months of 1881; Ionia for 1883–85; Manistique, Swartz Creek, for 1884–85; Mackinaw City for 1884–87; Muskegon, Pentwater for 1886; Marquette for 1879–84, 1886–87; Escanaba for 1880–87; Alpena, Grand Haven, Port Huron for 1879–87; Detroit for 1877–87; Otsego for 1887–90; Alma for 1890; Marshall for 1882–92; Gulliver Lake for 1887–90, 1892; Albion for 1890–91; Rockland for 1891–92; Battle Creek for 1877–80, 1882, 1885, 1888–89, 1891–93; Tecumseh for 1877–85, 1888–89, 1892–93; Harrisville for 1881–82, 1885–86, 1890–93; Thornville for 1877–93; Lansing for 1879–93; Agricultural College for 1877, 1881–93; Ann Arbor for 1881–93; Birmingham for 1887–93; Traverse City for 1882–93.

* Beginning with the year 1885, allowance must be made for Lansing in Exhibit 9, because of a change in location of the instruments. The amount of the variation by months is shown in Exhibit A, on page 22, Report for 1886.

EXHIBIT 10.—*Comparison of the Average Temperature during the Year and during each month of the year 1894, with the Annual and with the Monthly Averages for the Year 1893, and with the Averages for the 30 Years, 1864–93. Observations made by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Michigan.*

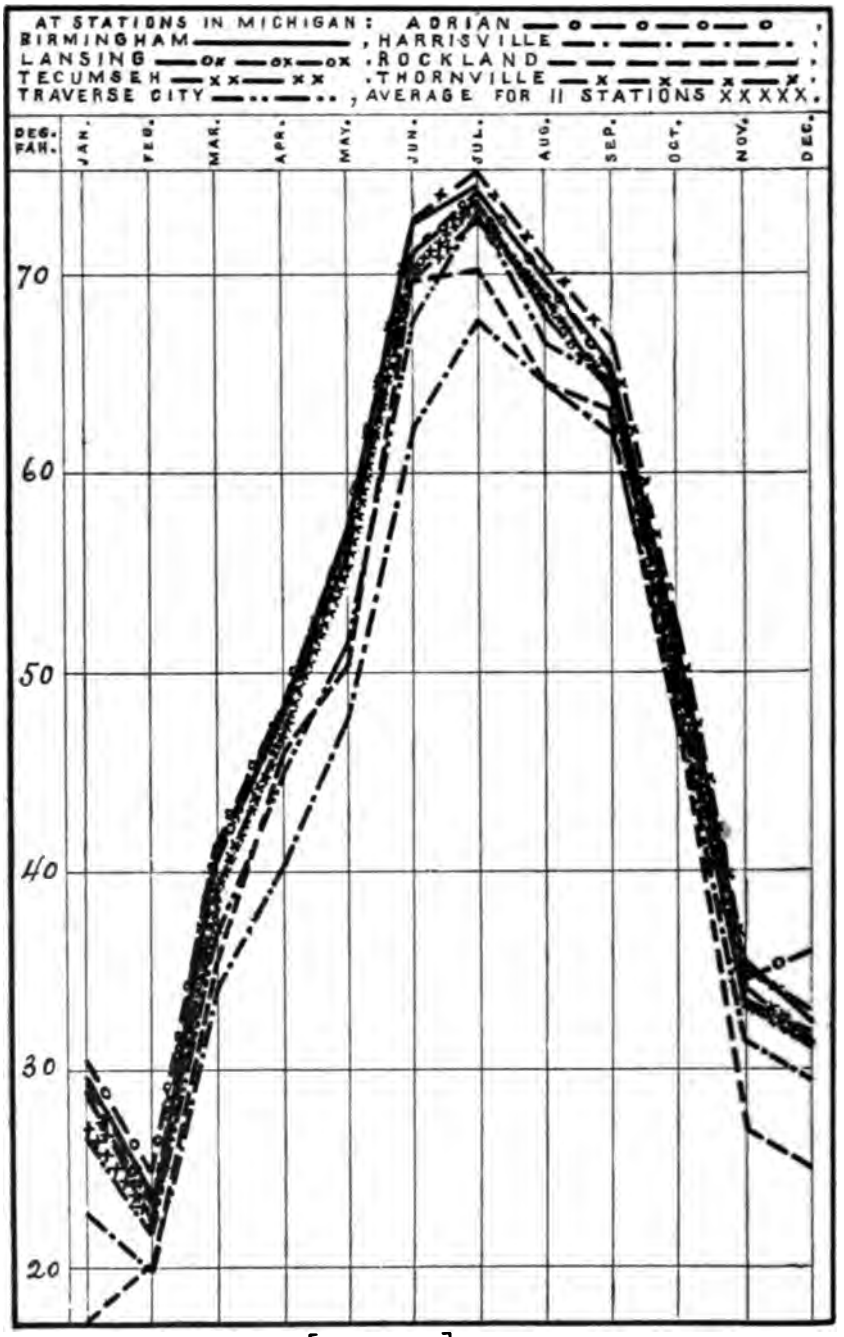
Years, etc.	Average Temperature—Degrees Fahr.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 30 years, 1864-93.	46.44	21.74	23.91	30.73	45.67	57.66	67.58	71.27	68.14	60.31	48.19	35.54	26.36
1893	44.98	14.80	21.31	28.16	43.50	54.40	66.60	71.50	68.10	58.41	49.70	35.63	27.60
1894	48.58	26.88	21.15	40.06	48.44	56.94	71.38	73.22	68.80	62 66	49.80	32.48	30.12
In 1894 Higher than Av. for 30 years, 1864-93	2.14	5.14		9.33	2.77		3.80	1.95	.26	3.35	1.61		3.76
In 1894 Lower than Av. for 30 years, 1864-93			2.76			.72						3.06	
In 1894 Higher than in 1893	3.60	12.08		11.90	4.94	2.54	4.78	1.72	.70	5.25	.10		2.52
In 1894 Lower than in 1893			.16									3.15	

EXHIBIT 11.—*Average Temperature by Year and Months in 1894* compared with Annual and Monthly Averages for 1893, and for the 15 Years, 1879–93. Observations made at Office State Board of Health, State Capitol, Lansing, Michigan.*

Years, etc.	Average Temperature—Degrees Fahr.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 15 years, 1879-93.	47.15	21.79	24.40	30.91	45.94	57.77	67.83	71.97	68.60	61.51	50.08	36.79	28.24
1893	46.08	15.09	20.68	32.19	43.98	55.20	69.14	72.14	68.47	60.22	51.19	36.40	27.70
1894	49.00	28.56	22.70	40.48	47.77	56.20	71.04	73.59	67.84	64.21	50.39	33.41	31.78
In 1894 Higher than Av. for 15 years, 1879-93	1.85	6.77		9.57	1.83		3.21	1.62		2.70	.31		3.54
In 1894 Lower than Av. for 15 years, 1879-93			1.70			1.57			.76			3.38	
In 1894 Higher than in 1893	2.97	13.47	2.02	8.29	3.79	1.00	1.90	1.45		3.99			4.08
In 1894 Lower than in 1893									.63		.80	2.99	

* Beginning with the year 1885, slight allowance should be made for Lansing in Exhibit 11, because of a change in the location of the instruments. The amount of the variation by months is shown in Exhibit A, on page 22, Report for 1886.

DIAGRAM I.—AVERAGE TEMPERATURE BY MONTHS, 1894.



[PLATE 600]

LE I.—*Average temperature in Degrees Fahr., for the Year, and for each Month the Year 1894, at each of 11 stations in Michigan, and also average line for the stations. From observations made daily at 7 A. M., 2 P. M. and 9 P. M.,* local ne, by observers† for the State Board of Health.*

ions in Michigan.†	Divisions of the State. ‡‡	Temperature in Degrees Fahr.													
		Year.		Months, †† 1894.											
		Norm. **	1894.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
for 11 stations §			48.49	27.19	22.37	38.70	46.90	55.24	70.37	73.30	68.74	64.45	50.14	33.09	31.40
kland	U. P.		44.26	f 17.29	i 20.11	c 30.54	h 46.00	h 50.44	d 69.78	f 70.17	j 64.41	h 63.14	f 47.60	h 26.80	g 24.88
rerse City	N. W.	43.99^{12}	47.20	25.65	21.61	36.82	44.84	51.42	67.50	73.05	66.37	64.54	50.61	32.99	31.05
risville	N. E.	42.72^{6}	44.15	22.72	19.90	34.12	40.26	47.66	62.22	67.76	64.37	61.81	48.46	31.26	29.27
ton	N. C.		¶				46.47	52.75	68.00	72.08	66.75	62.77	50.24	33.33	32.06
rnville	B. & E.	47.92^{18}	50.32	29.33	22.94	41.10	48.49	57.37	72.68	75.00	70.57	66.52	52.23	34.84	32.82
cultural College	C.	46.51^{31}	48.58	26.88	21.15	40.06	48.44	56.94	71.38	73.22	68.80	63.66	49.80	32.48	30.12
sing, S. B. of H.‡	C.	47.27^{16}	49.00	28.56	22.70	40.48	47.77	56.20	71.04	73.59	67.84	64.21	50.39	33.41	31.78
an	S. C.		49.95	30.48	24.77	41.28	48.00	56.55	70.76	74.02	69.71	64.90	h 48.68	34.39	f 35.85
on	S. C.		‖	30.20	24.01	40.80	49.10	57.00	71.90				48.35	34.70	32.30
Arbor	S. C.	46.87^{14}	49.49	29.30	23.20	40.03	47.70	57.00	71.90	74.70	69.80	64.80	50.00	33.59	31.80
le Creek	S. C.	49.77^{4}	51.88	30.45	24.32	41.39	49.31	60.20	74.78	77.85	75.96	66.27	52.20	34.96	34.28
mseh	S. C.	47.48^{3}	48.68	28.95	22.37	39.34	46.99	56.60	69.69	72.60	68.57	63.84	49.80	33.99	31.41
ingham	S. E.	47.65^{8}	49.95	a 29.49	22.95	c 40.50	48.08	57.25	e 72.36	b 74.36	b 69.78	65.28	51.86	d 35.32	33.14

e daily averages are one-third the sum of these three observations.
e names of observers, their place of observation, and the counties in which these places are situated, ited in Exhibit 1, page 2.
is line is an average for only the 11 stations from which statements nearly complete were received ery month of the year. It does not include Ashton and Albion.
umbers in this column state the average annual temperature for periods of years ending in each case December 31, 1894. The small figures above and at the right of numbers which state the temperature, the number of years included in the average.
he computations for Av. Temp., as tabulated for months in 1894 were made at the following stations: and Ann Arbor. All other computations in Table I. were made at the office of the State Board of h.
ginning with the year 1885, allowance must be made for Lansing in Table I., because of a change in cation of the instruments. The amount of the variation by months is shown in Exhibit A, on page port for 1888.
he names of divisions, and the counties in each, are stated in Exhibit I., in a paper which follows ekly reports of sickness.
e average for 9 months is 53.83. ‖ The average for 9 months is 43.15.
c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly the numbers from which they refer to the notes below.
r 30 days. b For 29 days. c For 28 days. d For 27 days. e For 26 days. f For 25 days. g For 23 days. 22 days. i For 21 days. j For 18 days.

he average line and lines for 7 representative stations in Table I. are hically represented in Diagram I., page 20.

TABLE II.—*Extremes of Temperature and Days of Month on which the High Range for the Year 1894, at each of 19 Stations in Michigan.—As indicated b 2 P. M. and 9 P. M., by Observers* for the State Board of Health, and for t*

Line Number.	Stations in Michigan.* (Those of the U. S. Weather Bureau in Italics.)	Year, 1894.			January.		February.		March.		April.		
		Highest.	Lowest.	Range.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.
1	At 16 Stations†....	102	-26	128	57	-18	54	-26	79	-2	88	12	94
2	Rockland ‡.....				57^{14}	-21^{26}	52^{6}	-22^{20}	65^{17}	$0^{24,25,26}$	82^{29}	10^{2}	82
3	*Marquette* §.....	100	-17	117	52^{14}	-9^{25}	46^{6}	-17^{20}	56^{4}	$5^{26,27}$	82^{30}	17^{2}	76
4	*Sault Ste. Marie* §.	94	-26	120	40^{20}	-14^{6}	41^{6}	-26^{24}	57^{18}	-2^{26}	71^{27}	12^{2}	73
5	Traverse City ‡....	100	-16	116	50^{17}	-6^{8}	49^{27}	-16^{23}	79^{18}	8^{26}	88^{30}	$22^{1,5}$	$1,12;$ 78
6	*Alpena* §.....	98	-14	112	50^{18}	-2^{25}	48^{7}	-14^{24}	77^{18}	8^{27}	62^{30}	18^{2}	78
7	Harrisville ‡.....	97	-15	112	48^{18}	-10^{24}	46^{7}	-15^{23}	74^{13}	5^{26}	61^{27}	15^{1}	$1;$ 76
8	*Grand Haven* §....	92	-5	97	57^{17}	$10^{25,26,28}$	45^{28}	-5^{24}	70^{18}	11^{26}	83^{30}	23^{2}	80
9	*Port Huron* §.....	96	-10	106	50^{19}	0^{25}	50^{9}	-10^{24}	72^{18}	10^{26}	76^{30}	22^{2}	81
10	Thornville ‡.....	101	-13	114	54^{18}	0^{25}	48^{28}	-13^{24}	76^{18}	9^{26}	80^{30}	22^{2}	87
11	Agr'l College ‡.....	102	-18	120	52^{17}	-18^{24}	47^{8}	-17^{23}	75^{18}	$9^{25,28}$	77^{30}	18^{1}	85
12	Lansing, S. B. of H. ‡ ¶	99	-9	108	$53^{17,18}$	-4^{24}	50^{28}	$-9^{23,24}$	74^{18}	10^{25}	80^{30}	21^{1}	86
13	Adrian ‡.....				54^{20}	-3^{24}	55^{9}	-6^{23}	75^{18}	8^{25}	80^{28}	25^{1}	85
14	Albion ‡				57^{18}	-2^{25}	50^{10}	-7^{23}	72^{18}	8^{25}	79^{30}	23^{2}	84
15	Ann Arbor ‖.....	97	-9	106	52^{18}	-4^{25}	49^{9}	-9^{24}	73^{18}	11^{26}	79^{28}	22^{2}	84
16	Battle Creek ‡	96	-6	102	54^{18}	-6^{24}	$52^{9,28}$	-5^{24}	$72^{17,18,21}$	8^{26}	$84^{28,30}$	$24^{2,3}$	94
17	Kalamazoo §	98	-6	104	52^{20}	-5^{25}	$50^{9,28}$	-6^{24}	74^{17}	11^{26}	81^{30}	$27^{2,8,9}$	86
18	Tecumseh ‡.....	94	-7	101	$51^{18,20}$	-7^{24}	53^{9}	-6^{23}	74^{18}	9^{25}	80^{28}	25^{1}	84
19	Birmingham ‡.....	98	-10	108	52^{18}	-5^{25}	50^{9}	-10^{23}	72^{18}	$12^{25,26}$	80^{30}	21^{1}	90
20	*Detroit* §.....	96	-11	107	50^{4}	-3^{25}	54^{9}	-11^{24}	72^{18}	12^{26}	78^{30}	24^{2}	83

NOTE.—The small figures above and at the right of numbers denoting the degrees of temperat the day or days of the month on which the highest or the lowest temperature occurred.

* The names of observers, etc., are stated in Exhibit 1, page 2.

† The line No. 1, and the three columns for the year 1894, relate only to the 16 stations fro observations were received for every month of the year. It does not include Adrian, Albion, a land.

‡ For stations marked thus ‡, the daily readings of registering thermometers were recorded a for the preceding calendar day.

§ At the stations of the U. S. Weather Bureau and at Kalamazoo, the maximum thermometer and recorded at 8:00 A. M., and the minimum at 8:00 P. M., 75th meridian time. The local time stations corresponding to 8:00 A. M. and 8:00 P. M., 75th meridian time, is as follows: at Port H A. M. and 7:30 P. M.; at Detroit, 7:28 A. M. and 7:28 P. M.; at Alpena, 7:26 A. M. and 7:26 P. M.; Haven, 7:15 A. M. and 7:15 P. M.; at Marquette, 7:11 A. M. and 7:11 P. M.; at Manistee, 7:15 A. M P. M.; at Sault Ste. Marie, 7:23 A. M. and 7:23 P. M.; at Kalamazoo, 7:18 A. M. and 7:18 P. M.

‖ At Ann Arbor the registering thermometers were read and recorded at 9 P. M.

¶ Beginning with the year 1885 allowance must be made for Lansing in Table II, because of a c the location of the instruments. The amount of the variation by months is shown in Exhibit B 22, Report for 1886.

Lowest Temperature occurred by Months of the year 1894; also, Extremes and dings of Registering Thermometers, or by Observations made daily at 7 A. M., ther Bureau.

June.		July.		August.		September.		October.		November.		December.		Line Number.
Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	
	33	102	37	99	32	99	29	80	20	67	-7	60	-19	1
30	34 1	97 17	44 6	-------	-------	93 1	32 25	76 20	27 10	54 1	0 17	53 20	-14 28	2
15	36 5	100 27	45 31	88 23	42 21	93 1	36 25	68 16	32 9	48 1	-1 19	50 14	-2 28	3
15	34 5	94 19	41 5	82 23	42 22	86 3	30 25	64 16	29 14	48 2	-7 19	47 21	-19 28	4
11	3, 4, 5 35	100 27	43 7	92 1	40 15, 16	93 2	11, 30 38	71 21	29 14	57 2	10 18	52 21	-5 27	5
15	34 6	98 27	45 7, 8	85 14	44 16, 17	92 2	32 25	69 16	29 15	51 2	9 20	52 21	-6 28	6
29	33 4	96 12	44 7	94 28	43 16	97 2	30 24	72 3	26 14	54 3	5 19	54 21	27, 28 -12	7
22, 23	5, 6 39	92 19	52 8, 9	1, 7, 8, 23 84	16, 22, 31 47	88 2	40 25	72 21	27 15	60 2	19, 28 16	52 20	5 28	8
30	35 6	96 19	5, 7, 9 47	92 7	43 22	92 2	36 25	78 21	25 15	64 2	12 29	53 8	-4 28	9
23	38 6	101 19	48 8	96 7	46 21	97 2	25, 26 36	79 19, 21	28 15	67 2	20, 29 18	54 21	-6 28	10
21	34 6	102 19	37 4, 8	99 8	32 3	99 2	24, 25 29	80 21	20 14	65 2	10 28	53 8, 21	-10 27	11
21, 22	38 5	99 19	46 6	93 8	43 3	98 2	35 24	78 21	25 14	62 2	14 19	56 21	-5 27	12
23, 24	39 5	98 19	47 6	96 8	43 21	93 2, 3	32 25	75 2	26 14	64 2	19, 28 14	53 8, 21	-------	13
23	40 5	-------	-------	-------	-------	-------	-------	20, 21, 22 73	14, 15 30	61 8	15 19	55 21	0 27	14
22	42 5	97 19	48 7	92 8	46 4, 22	93 2	25, 26 37	75 19	28 15	64 2	14 20	54 8	-4 28	15
3, 23, 24	42 5	96 19	51 7	92 8	49 3	89 2, 3	24, 25 39	75 21	31 14	64 1	16 11	60 21	1 27	16
23	40 6	98 19	47 7	94 8	49 22	92 2	37 25	75 21	33 14	63 2	16 12	56 21	-4 28	17
4, 23, 24	40 1, 5	93 19	48 6	94 8	42 3	90 2, 3	35 25	75 21	25 14	63 2	19, 28 15	54 8	0 27	18
22, 30	40 5	98 19	47 6, 7, 8	94 7	45 21	93 2	34 24	75 19, 21	25 14	62 2	19, 28 14	54 8	-3 27	19
12	38 2	96 19	48 7	92 7	47 4	91 2	39 25	76 21	29 15	64 2	17 20	55 8	-3 28	20

The average daily range of temperature at from 6 to 19 stations per year, months, for a period of 15 years, 1879–93, and a comparison of 1894 h the monthly averages for that period and for 1893, are given in hibit 13, page 24. The highest and lowest temperatures in every month 1894, at each of 16 stations, are stated in Table II., pages 22 and 23. e average daily range of temperature by months in 1894, at each of 20 tions, and the average for 16 of the stations, are stated in Table III., ge 26. The lines for 7 of these stations, and the average line for 16 of stations, are represented in Diagram II., page 27. It will be noticed t the greatest average daily range occurred during the months of July d August.

EXHIBIT 12.—*Average Temperature in Degrees Fah., for the year and months, 1894, at Office State Board of Health, State Capitol, Lansing, Michigan, computed from readings at 7 A. M., 2 P. M. and 9 P. M., daily, from registers of the Draper self-Recording Thermometer, compared with observations made with Green's Standard mercurial Thermometer at the same hours; both thermometers placed in double latticed shelter for instruments, in southwest part of Capitol yard.*

Tri-daily readings of instruments specified.	Year.	Average Temperature, in Degrees Fahr.—Year and Months, 1894.											
		Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. Temp. from tri-daily observations with Green's Standard Mercurial Thermometer	49.00	28.56	22.70	40.48	47.77	56.20	71.04	73.59	67.84	64.21	50.39	33 41	31.78
Av. Temp. computed from readings of the Draper's Self-Recording Thermometer	48.53	29.10	23.67	40.33	46.97	54.83	69.07	71.66	66.88	62.99	50.45	34.19	32.27
Higher by Draper's than by Green's Thermometer		.54	.97								.06	.78	.49
Lower by Draper's than by Green's Thermometer	.47			.15	.80	1.37	1.97	1.93	.96	1.22			

EXHIBIT 13.—*Average Daily Range of Temperature, by Year and Months in 1894, compared with Annual and Monthly Averages for 1893, and for the 15 years, 1879-93. These Averages are for Groups of Several Stations in Michigan.**

Years, etc.	Average Daily Range of Temperature—Degrees Fahr.													
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	
Av. 15 years, 1879-93	18.01	15.84	17.33	17.42	19.20	20.27	20.32	20.88	20.22	20.03	17.19	14.13	13.27	
1893 (15 stations)	17.92	15.05	18.20	16.64	16.32	19.20	20.52	20.75	22.12	20.36	17.27	14.28	14.31	
1894 (16 stations)	17.84	14.45	16.90	16.65	17.86	18.20	22.70	23.15	23.16	20.53	15.76	12.59	12.08	
In 1894 Greater than Av. for 15 years, 1879-93							2.38	2.27	2.94	.50				
In 1894 Less than Av. for 15 years, 1879-93	.17	1.39	.43	.77	1.34	2.07					1.43	1.54	1.19	
In 1894 Greater than in 1893					.01	1.54		2.22	2.40	1.04	.17			
In 1894 Less than in 1893	.08	.60	1.30			1.00					1.51	1.69	2.23	

* Otisville for 1879-80, 1882; Escanaba for 1880-87; Adrian for 1880; Reed City for 1882, 1884-85; Washington for 1882-83; Winfield for 1883; Manistique, Ionia, Swartz Creek for 1884-85; Mackinaw City for 1884-87 Hillsdale for 1884; Pentwater, East Saginaw, Hudson for 1886; Port Austin for 1888-89; Gulliver Lake for 1887-90, 1892; Alma, Otsego for 1890; Albion for 1890-91; Manistee for 1889-92; Marshall for 1882-92; Rockland for 1891-92; Tecumseh for 1883-85, 1892-93; Battle Creek for 1879-80, 1888-89, 1891; Marquette for 1879-84, 1886-93; Grand Haven for 1879-88, 1890-93; Detroit, Lansing, for 1879-93; Alpena, Port Huron, Thornville, for 1880-93; Kalamazoo for 1880-1888, 1886-90, 1892-93; Agricultural College for 1881-98; Traverse City for 1882-93; Harrisville for 1882, 1885-93; Ann Arbor for 1882-83, 1885-93; Birmingham for 1887, 1889-93; Sault Ste. Marie for 1892-93.

EXHIBIT 14.—*Comparisons of the Average Daily Range of Temperature for the Year and for each Month of the Year 1894, with Averages for the 20 years, 1874–93, and for the Year 1893. Observations made with Registering Thermometers by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Michigan.*

Years, etc.	Average Daily Range of Temperature—Degrees Fahr.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 20 years, 1874–93*	20.79	11.85	18.71	18.99	22.11	23.30	22.47	24.68	25.46	24.62	20.86	16.28	15.18
1893	21.74	17.23	19.30	19.70	16.10	18.80	21.90	25.90	29.80	29.10	23.90	20 60	18.60
1894	23.12	19.45	19.72	17.71	20.70	21.19	29.80	34.97	34.39	26.77	22.07	15.17	15.54
In 1894 Greater than Av. for 20 years, 1874–93	2.33	7.60	1.01				7.33	10.29	8.93	2.15	1.21		.36
In 1894 Less than Av. for 20 years, 1874–93				1.28	1.41	2.11						1.11	
In 1894 Greater than in 1893	1.38	2.22	.42		4.60	2.39	7.90	9.07	4.59				
In 1894 Less than in 1893				1.99						2.33	1.83	5.43	3.06

*For the years 1874-6, 1878, 1879 (except Nov. and Dec.), and 1880, the computations were made from the report of observations published in the Reports of the State Board of Agriculture for those years. For 1877, 1881 (except Jan.), 1883-93, the computations were made from registers or copies of registers supplied by Dr. Kedzie.

The average annual and monthly temperature at from 11 to 22 stations for a period of 17 years, 1877–93, is stated in Exhibit 9, page 18, in which is also given, by months, a comparison of 1894 with the average for 1893, and with the averages for the 17 years, 1877–93. By Exhibit 9, page 18, which gives averages for groups of several stations in Michigan, it appears that in 1894 the mean temperature in October and November was lower than in those months in 1893. It also appears that January, March, April, June, July, August, September, October and December were warmer than the average temperature of the corresponding months for the 17 years, 1877–93.

By Exhibit 16, page 29, it appears that, at the Agricultural College, the lowest temperature reached in June, 1894, was below the average lowest temperature for the corresponding month in the preceding 21 years, and that in the month of January, 1894, the range of temperature was greater than the average range of temperature for the corresponding month in the 21 preceding years, and also the highest temperature for 1894 was higher than the average highest temperature for the preceding 21 years, and the lowest temperature was below the average lowest temperature for those years. The highest and lowest temperatures at the Agricultural College, in every month of the 7 years, 1888–94, and comparisons of months in 1894, with the average highest and lowest temperatures by months for the preceding 21 years, are stated in Exhibit 16.

TABLE III.—*Average Daily Range of Temperature, by Registering Thermometers during the Year and during each Month of the Year 1894, at each of 16 Stations in Michigan, and Average for 16 Stations.*

Stations in Michigan.* (Those of the U. S. Weather Bureau in Italics.)	Divisions of the State,†	Norm. ‡	Average Daily Range of Temperature—Degrees Fahr.												
			Year, 1894.	Months, 1894.											
				Jan.	Feb.	Mar.	Apr.	May.	Jun.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 16 Stations §			17.84	14.45	16.90	16.65	17.88	18.20	22.70	23.15	23.16	20.53	15.76	12.59	12.08
Rockland	U. P.		‖	c 19.89	e 25.68	a 21.42	d 31.62	g 28.05	a 25.24	a 26.08		d 25.42	a 21.69	f 16.46	b 18.28
Marquette	U. P.	15.18 9	14.22	13.23	15.93	12.50	13.90	13.13	19.03	17.32	16.70	16.60	11.50	10.10	10.70
Sault Ste. Marie	U. P.	16.73 3	16.68	14.80	19.30	13.80	18.90	16.90	24.60	22.40	19.10	18.70	10.10	11.00	10.60
Traverse City	N. W.	19.69 13	19.85	15.96	21.54	19.29	20.74	20.42	24.24	28.48	25.42	22.14	16.68	11.28	12.09
Alpena	N. E.	15.70 15	14.59	12.50	16.10	13.50	13.60	14.20	19.00	19.50	18.40	16.50	12.70	9.30	9.80
Harrisville	N. E.	20.13 10	19.24	18.90	24.96	18.58	15.30	17.03	20.93	22.71	22.55	21.00	16.52	16.14	16.22
Grand Haven	W.	14.68 5	14.63	11.10	13.10	13.50	15.90	16.30	18.00	18.30	19.60	16.00	13.30	11.40	9.10
Ashton §§	N. C.		¶				21.10	25.16	29.55	30.48	33.32	26.76	23.81	15.30	13.23
Port Huron	B. & E.	15.81 15	15.98	11.30	13.10	15.10	16.20	17.40	21.50	19.40	19.30	19.40	16.20	11.60	11.20
Thornville	B. & E.	23.19 15	17.40	12.26	14.14	15.03	18.67	19.26	22.87	22.49	23.48	21.77	16.26	11.40	11.13
Agricultural College	C.	20.47 13	23.12	19.45	19.72	17.71	20.70	21.19	29.80	34.97	34.39	26.77	22.07	15.17	15.54
Lansing, S. B. of H.	C.	19.43 16	19.12	14.33	16.86	18.77	19.13	19.39	23.13	25.35	25.65	23.08	18.39	12.67	12.74
Adrian	S. C.		20.10	16.25	17.10	20.48	21.30	20.87	24.50	26.00	28.52	23.50	g 15.57	15.10	e 11.97
Albion	S. C.		‖‖	14.60	17.90	18.90	18.10	18.50	22.60				12.80	12.25	13.20
Ann Arbor	S. C.	17.89 13	17.75	14.10	13.94	16.30	17.33	17.58	22.53	22.89	23.51	20.44	16.35	14.28	13.80
Battle Creek	S. C.		¶¶	16.61	17.00	21.07	20.80	19.07	a 21.10	21.49		19.43	16.19	14.87	14.19
Kalamazoo	S. C.	16.61 3	17.93	13.31	15.91	18.80	18.73	20.65	23.57	23.00	22.39	19.58	14.90	12.85	11.47
Tecumseh	S. C.	19.56 3	19.19	15.77	17.75	19.77	19.10	19.77	22.00	21.97	25.52	22.47	19.37	13.67	13.33
Birmingham	S. E.	21.23 8	20.14	16.29	18.57	18.45	19.77	20.61	26.17	25.51	26.45	22.87	18.71	14.44	13.54
Detroit	S. E.	15.59 16	15.41	11.58	12.40	14.80	16.50	16.50	21.30	20.10	19.50	17.67	13.55	11.10	9.57

* The names of observers, their places of observation, and the counties in which these places are situated, are stated in Exhibit 1, page 2.

† For counties in each division see Exhibit I., in a paper which follows on weekly reports of sickness.

‡ Numbers in this column state the annual average range of temperature for periods of years ending in each case with December 31, 1894. The small figures above and at the right of numbers which state the range of temperature, denote the number of years included in the average.

§ This line is an average for all stations for which statements nearly complete are given for every month of the year. It does not include the lines for Ashton, Albion, Rockland, and Battle Creek.

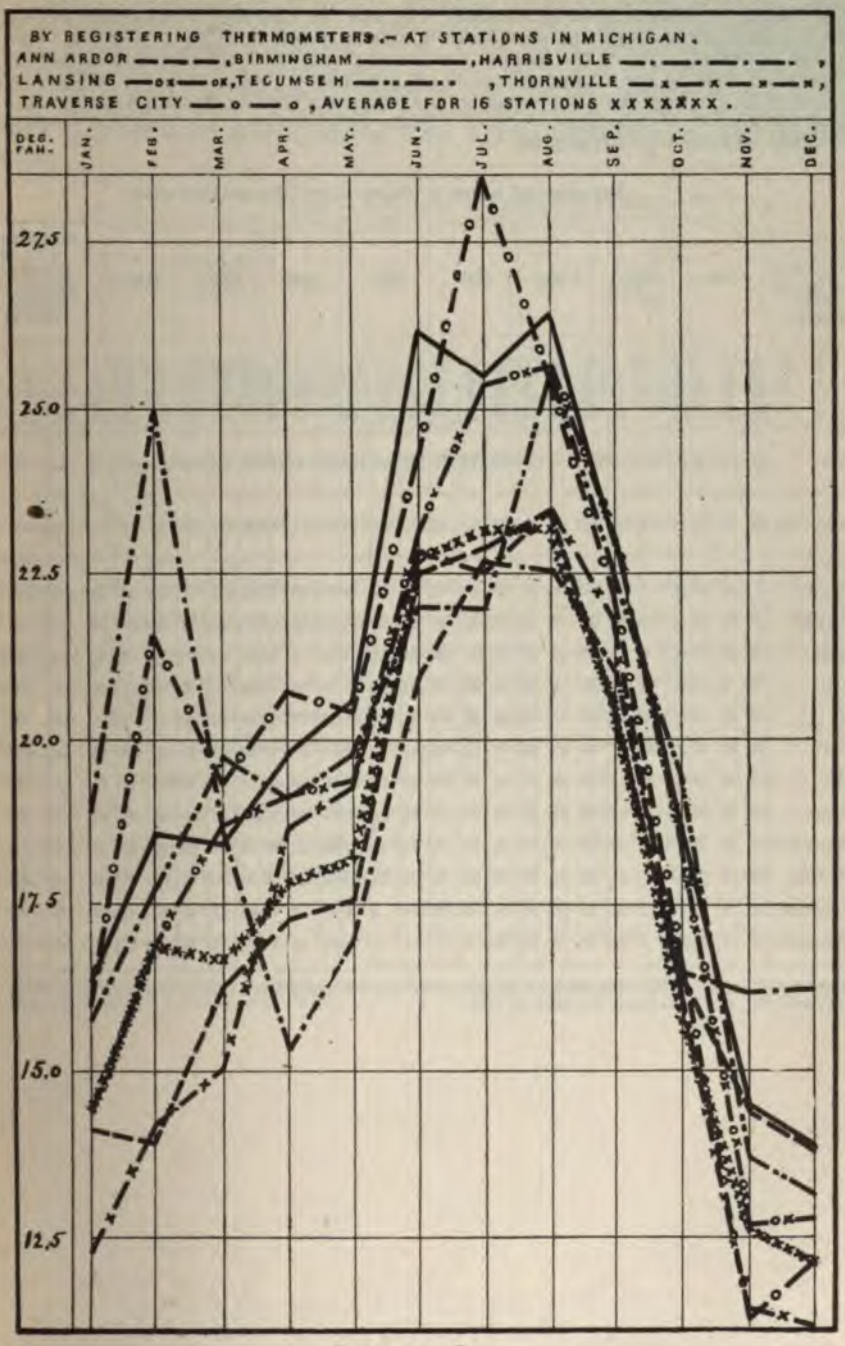
‖ The average for 11 months is 23.62. ¶ For 9 months, 24.30. ‖‖ For 9 months, 16.54. ¶¶ For 11 months, 18.35. §§ At Ashton the maximum temperature was apparently obtained from the tri-daily readings of the dry bulb of psychrometer.

a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly above the numbers from which they refer to the notes below.

a For 29 days. b For 28 days. c For 27 days. d For 26 days. e For 25 days. f For 24 days. g For 23 days.

NOTE.—Graphic representations of statements in Table III., are given in Diagram II, page 27.

DIAGRAM II.- AV. DAILY RANGE OF TEMPERATURE, BY MONTHS, 1894.



[PLATE 501]

EXHIBIT 15.—*Comparisons of the Extremes and the Range of Temperature (Degrees Fahr.) during the Year, and during each month of the Year, 1894, with the Average of the Extremes, and of the Range, for the 17 Years 1877–93, also, Statement of the Extremes and of the Range for each of the Seven Years, 1888–94. Observations made with Registering Thermometers by Observers for the State Board of Health, and for the U. S. Weather Bureau. These Comparisons, etc., are for* **Groups of Several Stations in Michigan.**

Year and Months.	Extremes and ranges of Temperature—Degrees Fahrenheit.																										
	1888.			1889.			1890.			1891.			1892.			1893.			Av. for 17 years, 1877-93.			1894.*			1894 Higher (+), or Lower (-), than Av. 17 years, 1877-93.		
	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.
Year	99	-33	132	97	-23	120	100	-26	126	100	-14	114	102	-24	126	97	-26	123	99	-26	125	102	-26	128	+3	=	+3
Av. month	76	9	67	77	14	63	79	10	68	78	14	64	77	12	65	77	11	66	78	11	67	81	10	71	+3	−1	+4
January	45	-23	68	53	-7	60	66	-14	80	52	-10	62	57	-22	79	49	-26	75	54	-21	75	57	-18	75	+3	+3	=
February	49	-33	82	49	-23	72	63	-8	71	55	-14	69	52	-24	76	44	-23	67	55	-20	75	54	-26	80	−1	−6	+5
March	69	-20	89	65	5	60	59	-26	85	58	-8	66	64	-13	77	66	-6	72	65	-14	69	79	-2	81	+14	+12	+12
April	88	6	82	80	14	66	80	1	79	87	10	77	79	13	66	80	9	71	83	8	75	88	12	76	+5	+4	+1
May	84	21	63	95	23	72	91	21	70	85	25	60	85	27	58	88	27	61	89	23	66	94	30	64	+5	+7	−2
June	99	29	70	93	36	57	98	32	66	97	31	66	102	34	68	96	36	60	95	33	62	98	33	65	+3	=	+3
July	97	40	57	97	36	61	98	39	59	95	37	58	97	41	56	96	43	53	98	40	58	102	37	65	+4	−3	+7
August	94	33	61	94	37	57	100	34	66	100	37	63	95	37	58	97	38	59	97	37	60	99	32	67	+2	−5	+7
September	90	28	62	93	25	68	90	27	63	93	35	58	92	30	62	89	22	67	93	29	64	99	29	70	+6	=	+6
October	73	23	50	76	14	62	80	24	56	87	21	66	82	23	59	84	22	62	84	20	64	80	20	60	−4	=	−4
November	72	8	64	66	11	55	68	0	68	65	-3	68	64	5	59	68	6	62	69	2	67	67	-7	74	−2	−9	+7
December	55	1	54	65	2	63	50	-6	56	60	8	52	58	-11	69	62	-14	76	58	-9	67	60	-19	79	+2	−10	+12

* For the 18 years, 1877-94, the highest temperature was 105°, at Battle Creek, September 9, 1884; the lowest was -36°, at Manistique, January 27, 1885.

3IT 16.—*Comparisons of the Extremes and the Range of Temperature (Degrees .) during the Year, and during each month of the Year 1894, with the Average s Extremes and of the Range, for the 21 years, 1873-93, also Statements of the emes and of the Range for each of the 7 years, 1888-94. Observations made Registering Thermometers (except for the first two months of 1873, and for two months with an ordinary thermometer, at 7 A. M., 2 P. M. and 9 P. M.) by Prof. R. C. Kedzie,* at the State Agricultural College, near Lansing, :

and hs.	Extremes and Range of Temperature—Degrees F.																										
	1888.			1889.			1890.			1891.			1892.			1893.			Av. 21 years, 1873-93.			1894.*			1894 Higher (+), or Lower (-), than Av. 21 years, 1873-93.		
	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.
.....	92	-19	114	93	-15	108	97	-4	101	97	-4	101	95	-20	115	95	-16	111	95	-17	112	102	-18	120	+7	-1	+8
nth...	72	18	54	73	20	53	74	21	53	73	19	54	71	19	52	74	18	56	73	18	55	78	15	63	+5	-3	+8
r	36	-16	52	50	2	48	63	3	60	51	2	49	50	-20	70	45	-16	61	48	-11	59	52	-18	70	+4	-7	+11
ry.....	45	-19	64	42	-15	57	61	12	49	54	-4	58	48	-14	62	43	-10	53	50	-9	59	47	-17	64	-3	-8	+5
.....	69	2	67	65	8	57	52	-4	56	58	2	56	62	9	53	63	5	58	60	1	59	75	9	66	+15	+8	+7
.....	81	21	60	75	20	55	76	20	56	79	19	60	73	20	53	76	21	55	77	17	60	77	18	59	=	+1	-1
.....	80	25	55	88	29	59	83	28	55	80	26	54	80	31	49	83	33	50	85	29	56	85	30	55	=	+1	-1
.....	92	39	53	85	39	46	92	39	53	88	37	51	87	42	45	90	51	39	90	40	50	96	34	62	+6	-6	+12
.....	90	47	43	89	47	42	92	44	48	86	42	44	95	45	50	92	46	46	93	46	47	102	37	65	+9	-9	+18
.....	90	36	54	93	42	51	97	34	63	97	40	57	90	45	45	95	38	57	93	40	53	99	32	77	+6	-8	+24
ber...	88	32	56	92	25	67	90	29	61	90	38	52	87	39	48	84	22	62	88	32	56	99	29	70	+11	-3	+14
r	73	26	47	73	17	56	76	25	51	84	21	63	78	24	54	84	22	62	78	21	57	80	20	60	+2	-1	+3
ber...	72	13	59	58	11	47	62	20	42	58	0	58	58	13	45	65	6	59	63	9	54	65	10	55	+2	+1	+1
ber ...	52	9	43	62	14	48	47	7	40	55	12	43	46	-10	56	62	-8	70	53	-2	55	53	-10	63	=	-8	+8

:he 22 years, 1873-94, the highest temperature was 101°, August 11, 1874; the lowest was -32°, r 8, 1875, and the range was 134° F.

EXHIBIT 17.—*Average Absolute Humidity, by year and months in 1894, compared with Annual and monthly Averages for 1893, and for the 17 years, 1877-93.* These Averages are for groups of several stations in Michigan.*

Years, etc.	Absolute Humidity—Grains of Vapor in a Cubic Foot of Air.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 17 years, 1877-93†	3.44	1.43	1.55	1.80	2.77	3.90	5.50	6.07	5.73	4.88	3.53	2.33	1.80
1893 (7 stations)	3.51	1.19	1.42	2.03	2.77	3.83	6.12	6.50	5.58	4.78	3.72	2.37	1.83
1894 (7 stations)	3.61	1.77	1.40	2.52	3.12	4.16	6.07	5.90	5.43	5.32	3.59	2.04	1.98
In 1894 Greater than Av. for 17 years, 1877-93	.17	.34	-----	.72	.35	.26	.57	-----	-----	.44	.06	-----	.18
In 1894 Less than Av. for 17 years, 1877-93	-----	-----	.15	-----	-----	-----	-----	.17	.30	-----	-----	.29	-----
In 1894 Greater than in 1893	.10	.58	-----	.49	.35	.33	-----	-----	-----	.54	-----	-----	.15
In 1894 Less than in 1893	-----	-----	.02	-----	-----	-----	.05	.60	.15	-----	.13	.33	-----

* Beginning with the year 1885, allowance must be made for Lansing in Exhibit 17, because of a change in the location of the instruments. The amount of variation by months is shown in Exhibit C, on page 23, Report for 1886.

† Kalamazoo for 1877-83, 1886-89; Mendon for 1877-82; Otisville for 1878-80, 1882; Niles for 1878-79, 1881; Nirvana for 1878-79 and first four months of 1880; Reed City for last eight months of 1880 and 1881-85; Benton Harbor, Coldwater, for 1877-78; Washington for 1880-83; Petoskey for 1879; Winfield for 1881, 1883; Woodmere Cemetery for 1877-79; Hastings, Parkville for 1882; Hillsdale for 1882-84; Manistique for 1884-85; Mackinaw City for 1884-87; Ionia for 1884; Swartz Creek for 1884-85; Pentwater for 1886; Marquette for 1879-84, 1886-87; Escanaba for 1880-87; Alpena, Grand Haven, Port Huron for 1879-87; Detroit for 1877-87; Alma for 1890; Marshall for 1882-92; Gulliver Lake for 1887-90, 1892; Rockland for 1892; Thornville for 1877-93; Lansing for 1879-93; Agricultural College for 1877, 1881-93; Ann Arbor for 1881-93; Traverse City for 1882-93; Birmingham for 1887-93; Battle Creek for 1877-79, 1882, 1885, 1892-93; Tecumseh for 1878-85.

EXHIBIT 18.—*Comparison of the Average Absolute Humidity for the year and for each month of the year 1894, with Averages for the 28 years, 1866-93, and for the year 1893. Observations made at 7 A. M., 2 P. M. and 9 P. M., daily, by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Mich.*

Years, etc.	Absolute Humidity—Grains of Vapor in a Cubic Foot of Air.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 28 years, 1866-93	3.47	1.46	1.57	1.85	2.72	4.01	5.67	6.34	5.89	4.83	3.35	2.23	1.71
1893	3.60	1.11	1.47	2.09	2.90	3.92	6.02	6.45	6.02	5.29	3.76	2.40	1.80
1894	3.79	1.74	1.36	2.59	3.33	4.29	6.16	5.98	6.52	5.60	3.76	2.11	2.04
In 1894 Greater than Av. for 28 years, 1866-93	.32	.28	-----	.74	.61	.28	.49	-----	.63	.77	.41	-----	.33
In 1894 Less than Av. for 28 years, 1866-93	-----	-----	.21	-----	-----	-----	-----	.36	-----	-----	-----	.12	-----
In 1894 Greater than in 1893	.19	.63	-----	.50	.43	.37	.14	-----	.50	.31	-----	-----	.24
In 1894 Less than in 1893	-----	-----	.11	-----	-----	-----	-----	.47	-----	-----	-----	.29	-----

BIT 19.—*Average Relative Humidity, by year and months, in 1894,* compared Annual and Monthly Averages for 1893, and for the 16 years, 1878–93. These ages are for groups of several stations in Michigan.*

ars, etc.	Per Cent of Saturation—Relative Humidity.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
years, 1878-93†	77	83	83	79	70	69	73	72	73	76	76	80	83
stations).....	79	89	88	84	73	72	74	72	70	75	79	82	88
stations).....	75	82	81	77	73	76	70	63	68	74	78	80	81
94 Greater Av. for 16 s, 1878-93.....					3	7					2	0	
4 Less than for 16 years, 93.....	2	1	2	2			3	9	5	2			2
94 Greater in 1893.....					0	4							
4 Less than 93.....	4	7	7	7			4	9	2	1	1	2	7

nning with the year 1885, allowance must be made for Lansing in Exhibit 19, because of a change cation of instruments. The amount of the variation is shown in Exhibit D, on page 28, Report

kinaw City for 1884–87; Kalamazoo for 1878–83, 1886–89; Mendon for 1878–82; Otisville for 1878–80, rvana for 1878–79 and first four months of 1880; Reed City for last eight months of 1880 and 1881–85; r 1878–79, 1881; Woodmere Cemetery for 1878–79; Washington for 1880–83; Coldwater for 1878; Petos- 1879; Mallory Lake for first seven months of 1881; Hudson for last five months of 1881; Hillsdale -84; Hastings for 1882; Winfield for 1883; Manistee, Swartz Creek for 1884–85; Ionia for 1884; Pent- r 1886; Marquette for 1879–84, 1886–87; Escanaba for 1880–87; Alpena, Grand Haven, Port Huron for Detroit for 1878–87; Gulliver Lake for 1887–90, 1892; Alma for 1890; Marshall for 1882–92; Albion for Rockland for 1892; Thornville for 1878–93; Lansing for 1879–93; Agricultural College, Ann Arbor -93; Traverse City for 1882–93; Birmingham for 1887–93; Harrisville for 1882, 1885–86; Battle Creek -79, 1882, 1885, 1892–93; Rockland for 1892; Tecumseh for 1878–85.

BIT 20.—*Comparison of the Average Relative Humidity of the Air (Per Cent aturation) for the year, and for each month of the year 1894, with Averages for 0 years, 1864–93, and for 1893. Observations made at 7 A. M., 2 P. M. and 9 P. laily, by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, higan.*

ars, etc.	Per Cent of Saturation—Relative Humidity.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
years, 1864-93.	79	87	86	83	70	69	76	73	75	79	79	83	86
.....	81	82	87	85	75	75	78	75	78	88	81	87	88
.....	78	83	77	77	72	75	72	65	88	80	85	86	86
94 Greater Av. for 30 , 1864–93.....					2	6			8	1	6	4	0
4 Less than for 30 years, 93.....	1	4	9	6			4	8					
94 Greater in 1893.....		1							5		4		3
Less than in	8		10	8	3	0	6	10		8		1	

TABLE IV.—ABSOLUTE HUMIDITY.—*The Average Number of Grains of Vapor of Water in a Cubic Foot of Air for Months and Year, 1894, at 12 Stations in Michigan; also Average Line for 7 Stations.—Average of Observations made Daily at 7 A. M., 2 P. M., and 9 P. M., by observers* for the State Board of Health.*

Stations in Michigan.*	Divisions of the State.†	Grains of Vapor in a Cubic Foot of Air—(Absolute Humidity.)§													
		Year.		Months, 1894.											
		Norm. ‡	1894.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 7 stations¶			3.61	1.77	1.40	2.52	3.12	4.16	6.07	5.90	5.43	5.32	3.59	2.04	1.98
Rockland	U. P.		**			e 2.08	j 2.86	k 3.15	d 5.40	f 5.45	m 5.12	i 4.61	d 3.47	h 2.00	
Traverse City	N. W.	3.37[13]	3.53	1.92	1.62	2.47	2.95	3.56	5.50	5.90	5.27	5.26	3.60	2.08	2.18
Harrisville	N. E.		††	..	0.78	1.76	2.25	3.10	5.09	5.62	5.20	4.92	3.24	1.59	1.50
Thornville	B. & E.	3.67[18]	3.60	1.96	1.58	2.72	3.18	4.36	5.88	5.79	4.94	5.00	3.52	2.17	2.14
Agr'l College	C.	3.51[15]	3.79	1.74	1.36	2.59	3.33	4.29	6.16	5.98	6.52	5.60	3.76	2.11	2.04
Lansing, S. B. of H.‖	C.	3.38[16]	3.42	1.69	1.28	2.48	3.00	4.07	5.90	5.36	4.94	5.06	3.45	1.93	1.83
Adrian	S. C.		‡‡	1.74	1.45	2.90	3.40	4.33	6.24	5.83	5.00	5.19	1 3.27		
Albion	S. C.		¶¶	1.46	1.38	2.54	3.24	4.40	6.48				3.46	1.96	1.87
Ann Arbor	S. C.	3.50[14]	3.62	1.72	1.43	2.44	3.00	4.12	6.46	6.07	5.47	5.39	3.49	1.91	1.88
Battle Creek	S. C.		§§							7.63	6.91	5.57	3.83	2.10	2.12
Tecumseh	S. C.		3.58	1.66	1.29	2.39	3.15	4.35	6.11	5.92	5.30	5.32	3.53	1.99	1.91
Birmingham	S. C.	3.58[8]	3.73	a 1.70	g 1.27	c 2.58	3.23	4.34	e 6.47	b 6.29	b 5.56	5.62	3.81	d 2.08	1.85

* The names of observers, their places of observation, and the counties in which these places are situated are stated in Exhibit 1, page 2.

† The full names of the divisions and the counties in each division are stated in Exhibit I., in a paper which follows, on weekly reports of sickness.

‡ Numbers in this column state the average annual Absolute Humidity for periods of years ending in each case with Dec. 31, 1894. The small figures above and at the right of numbers which state the Absolute Humidity, denote the number of years included in the average.

§ The number of grains of vapor in a cubic foot of air at each observation was determined from readings of the psychrometer by means of Glaisher's table, Table XII., of the Smithsonian Meteorological and Physical Tables (1859).

¶ This line is an average for only the stations at which observations were made tri-daily, and from which statements, nearly complete, were received for every month of the year. It does not include the lines for Harrisville, Albion, Rockland, Adrian and Battle Creek.

** The average for 9 months is 3.79. †† For 11 months, 3.19. ‡‡ For 8 months, 3.94. ¶¶ For 9 months, 2.98. §§ For 6 months, 4.69.

‖ Beginning with the year 1885, allowance must be made for Lansing in Table IV., because of a change in the location of the instruments. The amount of variation by months is shown in Exhibit C, page 23, Report for 1886.

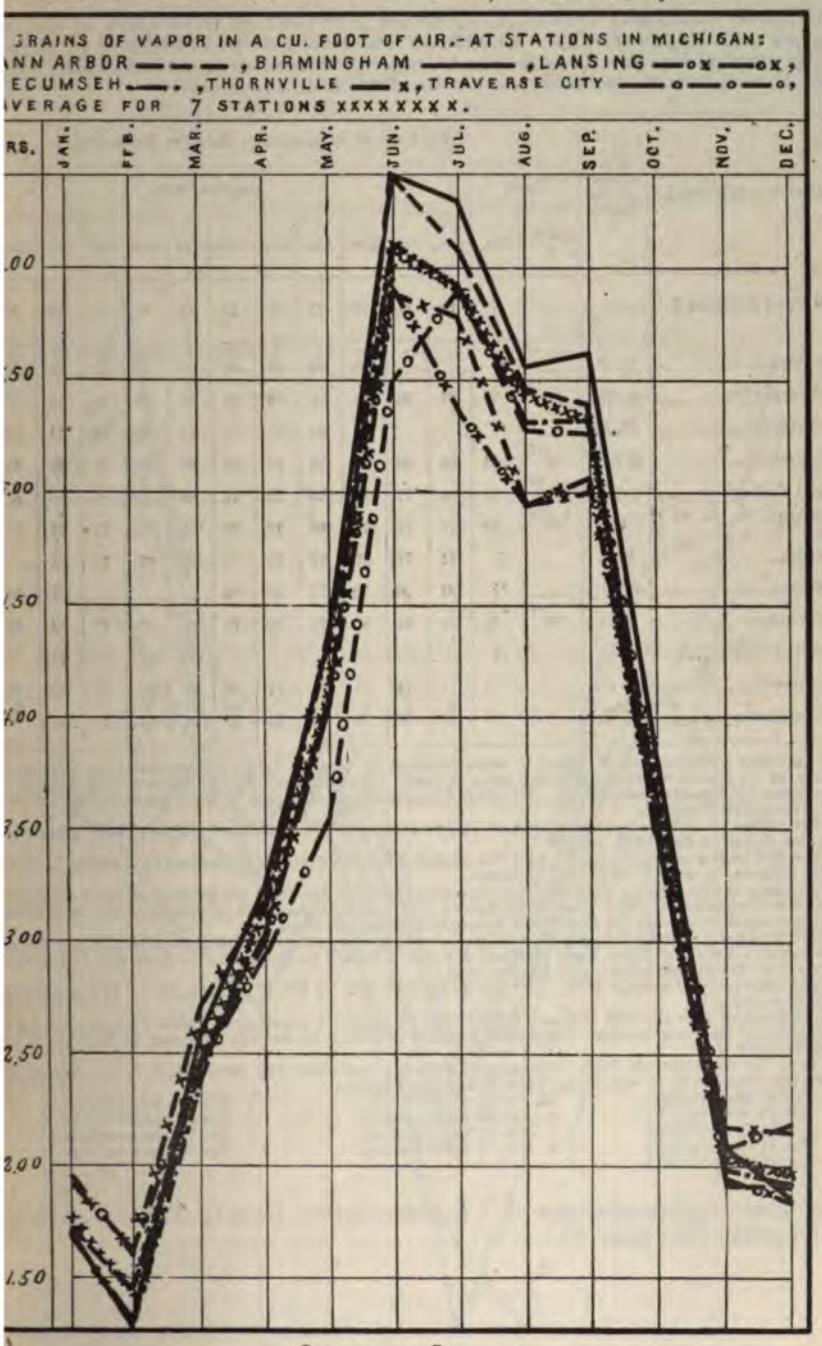
NOTE.—The computations of Absolute Humidity at Ann Arbor and Albion for each month in 1894 were furnished by the observers there. All other computations in Table IV. were made at the office of the Secretary of the State Board of Health.

a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly above the numbers from which they refer to the notes below.

a For 92 observations. b For 91 observations. c For 90 observations. d For 87 observations.
e For 86 observations. f For 84 observations. g For 82 observations. h For 81 observations.
i For 79 observations. j For 74 observations. k For 72 observations. l For 70 observations.
m For 59 observations.

The "average" line, and the lines for six stations in Table IV. are graphically represented in Diagram III, page 33.

DIAGRAM III.- ABSOLUTE HUMIDITY, BY MONTHS, 1894.



[PLATE 502]

TABLE V.—RELATIVE HUMIDITY.—*Average Per Cent of Saturation of the Atmosphere with Vapor of Water for Months and Year 1894 at 12 Stations in Michigan; also average line for 7 Stations. Average of observations made daily at 7 A. M., 2 P. M. and 9 P. M., by observers* for the State Board of Health.*

Stations in Michigan.*	Divisions of the State. †	Per Cent of Saturation.—Relative Humidity.													
		Year.		Months, 1894.											
		Norm. ‡	1894.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	July.	Aug.	Sep.	Oct.	Nov.	Dec.
Av. for 7 Stations §			75	82	81	77	73	76	70	63	68	74	78	80	81
Rockland	U. P.		¶			e 88	j 70	k 68	d 62	f 63	m 75	i 67	d 84	h 98	
Traverse City	N. W.	82[13]	79	96	92	82	75	74	69	64	70	74	78	82	90
Harrisville	N. E.		**			60	64	72	75	71	73	73	74	66	63
Thornville	B. & E.	78[17]	73	86	88	79	72	76	64	60	57	65	70	81	83
Agr'l College	C.	79[31]	78	83	77	77	72	75	72	65	83	80	85	86	86
Lansing, S. B. of H. ¶¶	C.	72[16]	70	77	73	70	68	72	67	57	63	71	75	75	74
Adrian	S. C.		‖	74	77	82	79	78	73	63	61	71	l 75		
Albion	S. C.		††	81	80	79	77	80	74				79	80	82
Ann Arbor	S. C.	79[14]	79	84	92	80	78	79	74	66	70	78	83	84	85
Battle Creek	S. C.		‡‡							74	67	72	75	72	74
Tecumseh	S. C.		73	74	74	74	72	77	73	65	66	75	79	76	76
Birmingham	S. E.	76[8]	74	a 75	g 73	c 76	74	76	e 72	b 66	b 68	77	79	d 76	73

NOTE.—The observations in Table V. were reduced by Guyot's table, in Smithsonian Meteorologic Tables, or by a table substantially the same as that. Computations for Ann Arbor and Albion in 18 were made by the observers there. All other Computations in Table V. were made at the office of t State Board of Health.

* The names of observers, their places of observation, and the counties in which these places are sit ated, are stated in Exhibit 1, page 2.

† The full names of the divisions, and the counties in each division are stated in Exhibit I., in a pap which follows, on weekly reports of sickness.

‡ Numbers in this column state the average annual relative humidity for periods of years ending in ea case with December 31, 1894. The small figures above and at the right of the numbers which state t relative humidity, denote the number of years included in the average.

§ This line is an average for only the stations at which observations were made tri-daily and fr m whi statements, nearly complete, were received for every month in the year. It does not include Albio Harrisville, Rockland, Adrian and Battle Creek.

¶ The average for 9 months is 75. ** For 10 months, 69.¶ ‖ For 10 months, 73. †† For 9 months, ‡‡ For 6 months, 72.

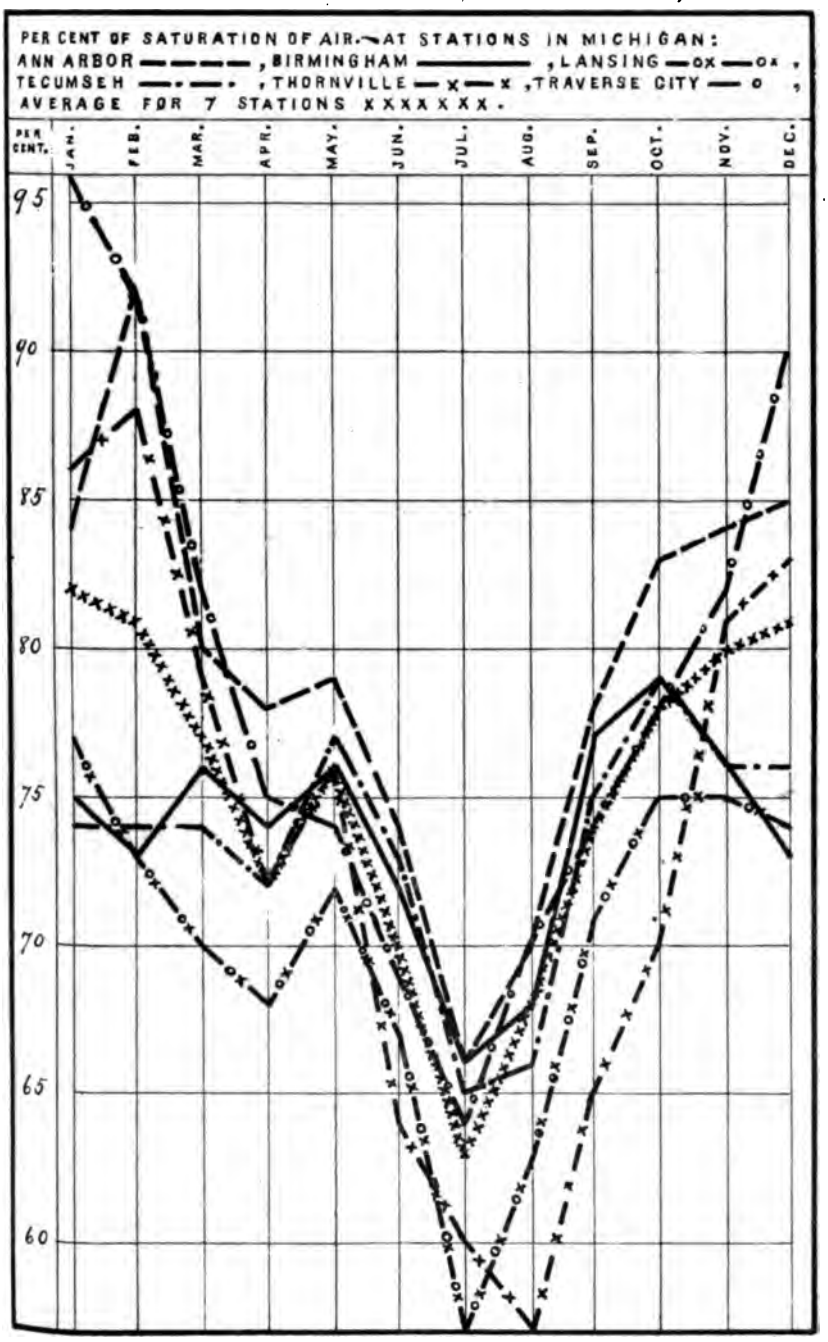
¶¶ Beginning with the year 1885, allowance must be made for Lansing in Table V., because of a chan in location of the instruments. The amount of the variation by months is shown in Exhibit D, on pa 23, Report for 1888.

a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand direct above the numbers from which they refer to the notes below.

a For 92 observations.	b For 91 observations.	c For 90 observations.
d For 87 observations.	e For 86 observations.	f For 84 observations.
g For 82 observations.	h For 81 observations.	i For 78 observations.
j For 74 observations.	k For 72 observations.	l For 70 observations.
m For 59 observations.		

Graphic representations of 7 representative lines in Table V. are give in Diagram IV., page 35.

DIAGRAM IV.- RELATIVE HUMIDITY, BY MONTHS, 1894.



[PLATE 803]

FOGS.

For the year 1894, fog was reported at 43 morning observations, s
afternoon observations (at about 2 P. M.), at 21 evening observations
about 9 P. M.), and 33 times during the day, no special time being m
tioned, in many cases the same fog, or fog at the same time, being repor
by different observers. Fog was reported, at one or more stations at so
time during the day, on 100 days.

EXHIBIT 21.—*Number of different days on which Fog was observed at one or m
of 15 Stations in Michigan* in 1894, and in each month of the year 1894.*

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	D
100	7	4	10	12	8	1	5	19	18	15	1	

* This Exhibit contains statements only for those localities from which reports were received for ev
month of the year, as follows: Rockland, Marquette, Traverse City, Grand Haven, Port Huron, Ba
Creek, Thornville, Lansing, Ann Arbor, Parkville, Birmingham, Tecumseh and Detroit.

Exhibit 21, "Number of different days on which fog was observed
etc., supplies knowledge of the *time*, in each month, on which fog w
observed, somewhere in Michigan. Exhibit 22, "Number of obser
tions at which fog was observed," etc., supplies knowledge of the *ti*
combined with the *area* of the occurrences of fog. For the State a
whole, therefore, the last-mentioned exhibit supplies the most imports
information. Therefore, in this Report the diagram relative to fog
made to exhibit the facts contained in this last-mentioned exhibit. He
tofore it has represented the "Number of different days on which fog w
observed at one or more stations in Michigan."

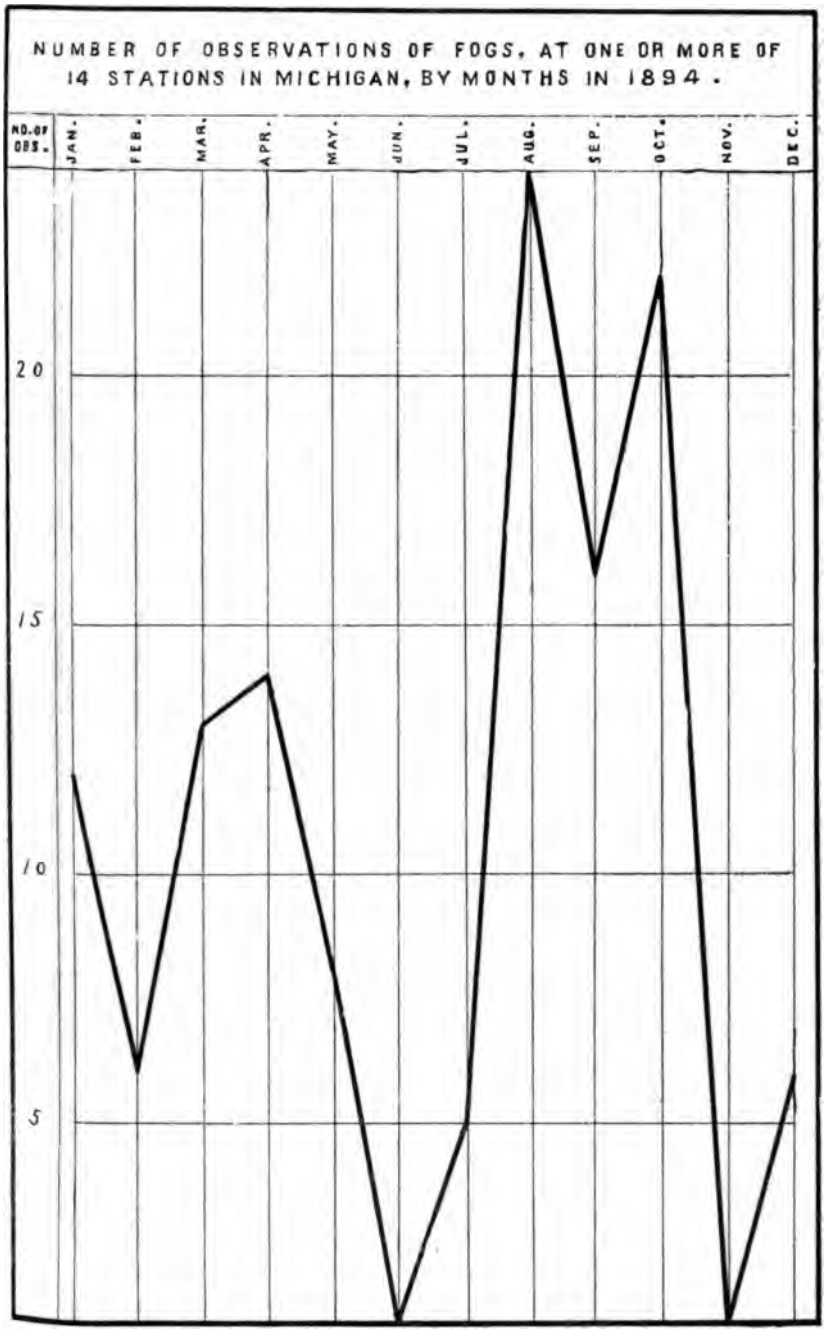
EXHIBIT 22.—*Number of observations at which Fog was observed in Michigan
1894, and in each month of the year 1894. (Observations taken 3 times daily,* at
Stations.†)*

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	D
128	12	6	13	14	8	1	5	24	16	22	1	

* At the U. S. Weather Bureau Stations the observations were made at 8 A. M. and 8 P. M., 75th Merid
time, unless otherwise stated in Exhibit 23.
† This exhibit contains statements only for those localities from which registers were received for ev
month of the year; the localities are stated in a foot-note to Exhibit 21 above.

NOTE.—Graphic representations of statements in Exhibit 22 are giv
in Diagram V., page 37.

DIAGRAM V.- CONCERNING FOGS IN MICHIGAN IN 1894.



[PLATE 804]

EXHIBIT 23.—*Number of different days on which Fog was recorded in 18 at 15*

Stations in Michigan.*	No. of days in 1894.	January.			February.		
		Day of Month.	Hour of Observation.		Day of Month.	Hour of Observatio	
			A. M.	P. M.		A. M.	P
Rockland	11	15	7:00	2 and 9	0		
Marquette	18	0			0		
Traverse City	5	16	7:00		0		
Grand Haven	17	14		1 till 4	8 and 28	Early till noon	
		15	A. M.	P. M.			
		16	Mid. night to day-break.				
		19	7:30 till 10:00				
Ashton	8	0			0		
Port Huron	44	0			7		6
					8	9:00	
Thornville	6	16	A. M.	P. M. and Night.	8	A. M.	
Lansing, S. B. of H.	16	14		Night till	7		Ni
		15	7:00 till	1:00	8	10:00	
		15		9:00 till			
		16	10:00				
Albion	2	0			0		
Ann Arbor	18	10, 15	Morning		8	A. M.	
		15		P. M.			
		16	Morning				
		18	A. M.				
		26		Evening			
Battle Creek	5	0			0		
Parkville	16	0			0		
Tecumseh	10	15		9:00	8	7:00	
		16	7:00				
Birmingham	5	0			0		
Detroit	1	0			2		

* The names of observers, their place of observation, and the counties in which the places ar are stated in Exhibit 1, page 2.

in each month, the dates and hours of observations† when Fogs were recorded in Michigan.

Line number.	March.			April.			May.			June.		
	Day of Month.	Hour of Observation.		Day of Month.	Hour of Observation.		Day of Month.	Hour of Observation.		Day of Month.	Hour of Observation.	
		A. M.	P. M.		A. M.	P. M.		A. M.	P. M.		A. M.	P. M.
1	5		2 and 9	13		9:00	0			0		
2	17		9:00	20	7:00	2 and 9						
3	18	7:00										
4	0			14,15,19			4			23		
5	0			17		9:00	23		9:00	0		
6				28		2:00						
7	1	Early		0			17	11:00 till	1:30	0		
8	18		7:30 till									
9	19	A. M.										
10	21		Noon till 3:00									
11	0			0			0			0		
12	6		9 till 10	16		Night till	20		Night till	0		
13	7		Night till	17	7:30		21	8:30				
14	8	8:30		21		Night till	23		Night till			
15	22		6 till 9	22	10:30		24	10:00	7 till 11			
16				28		5 till 11:30						
17	0			0			0			0		
18	0			0			0			0		
19												
20												
21												
22	0			0			0			0		
23	8	Morning		26, 27	Morning		0			0		
24	21	Morning										
25												
26												
27												
28	0			0			0			0		
29	8			0			8			0		
30	0			0			15	7:00		0		
31												
32	18	7:00		0			0			0		
33	0			0			0			0		

† At the U. S. Weather Bureau Stations during 1894, the observations were made at 8 A. M. and 8 P. M., 75th Meridian time, unless otherwise stated in this exhibit.

NOTE.—Registers were received, but with no fog recorded thereon, from Kalamazoo, Agricultural College, Harrisville, Sault Ste. Marie, Alpena and Adrian for each month in 1894. A cipher (0) indicates that a monthly register was received from the station with no fog recorded thereon.

EXHIBIT 23.—CONTINUED.—*Dates whe*

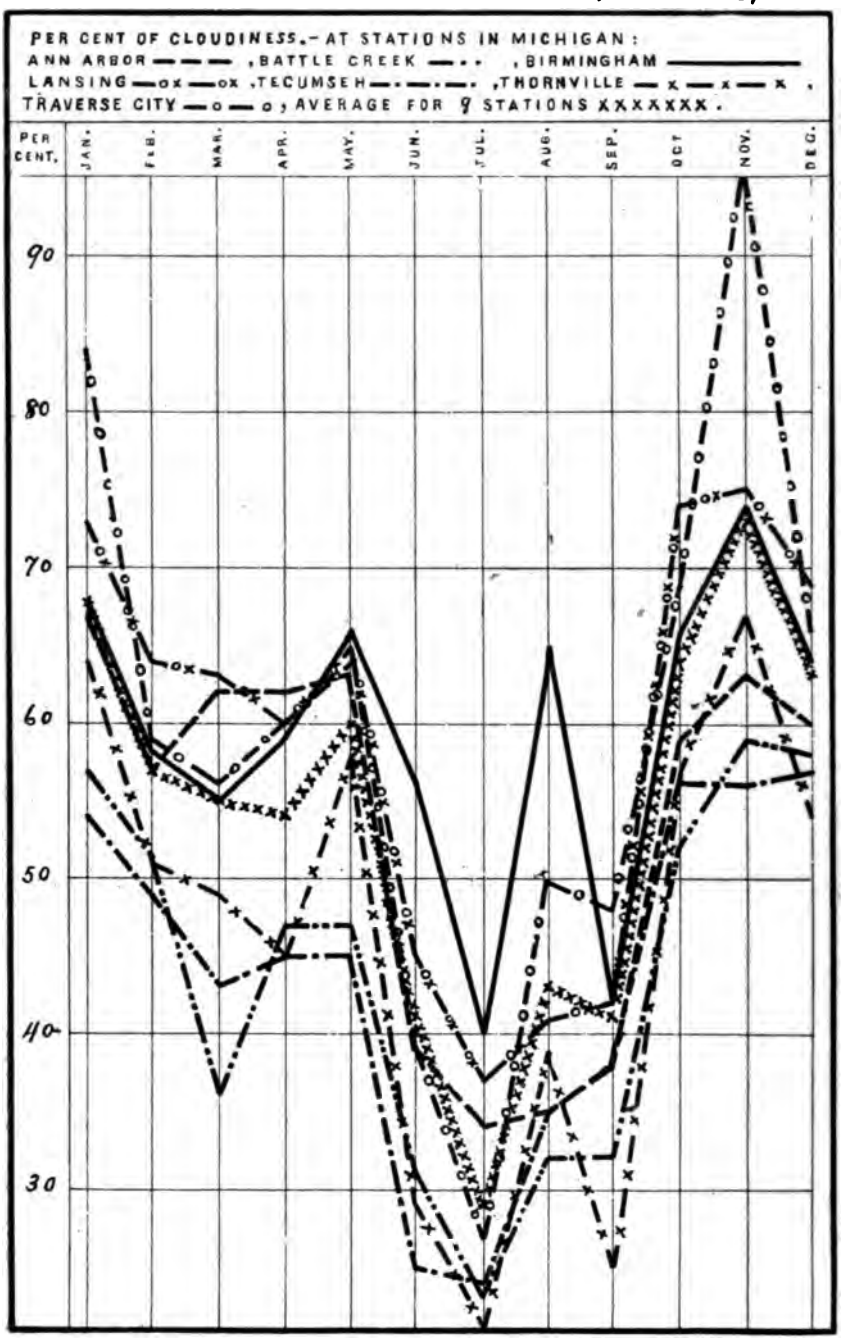
Stations in Michigan.	July.			August.			September.			Line Number.
	Day of Month.	Hour of Observation.		Day of Month.	Hour of Observation.		Day of Month.	Hour of Observation.		
		A. M.	P. M.		A. M.	P. M.		A. M.	P. M.	
Rockland	0			15	7:00	3:00	0			
Marquette	14			7, 12			22, 23			
Traverse City	0			0			0			
Grand Haven	0			30	Early till noon.		1	Midnight till daylight.		
				31	Early till 10:00	3:00*				
Ashton	0			16	Morning					
Port Huron				12		7:00 till				
	0			13	9:00		5		Night till	1
				19		Night till	6	9:30		1
				20	9:00		11		Night till	1
				22		Night till	12	8:45		1
				23	9:00		27		Night till	1
				26		Night till	28	9:00		1
				27	10:00					1
				28		Night till				1
				29	9:30					1
										1
										1
Thornville	25	Morning		0			28, 29	Morning		1
Lansing, S. B. of H.	0			1	Early till 8:45		6	6:15 to 11:00		1
				27		Night till	28	4:00 to 8:00		1
				28	10:30					1
				30		Night till				1
				31	9:00					1
Albion										1
Ann Arbor	0			16			26, 27, 28, 29	Morning		1
Battle Creek	0			9, 30	7:00		16, 19	7:00		1
Parkville	2, 4, 5			5, 11, 20, 30, 31			5, 16, 29			1
Tecumseh	0			0			0			1
										1
Birmingham	0			0			29	7:00		1

* Lifted at daylight Sept. 1.

Fogs were recorded in 1894.

Line Number.	October.			November.			December.		
	Day of Month.	Hour of Observation.		Day of Month.	Hour of Observation.		Day of Month.	Hour of Observation.	
		A. M.	P. M.		A. M.	P. M.		A. M.	P. M.
1	23		9:00	0			8	7:00	
2	24, 26	7:00							
3	24, 26			0			8		
4	8	7:00		0			0		
5	20	8:30 to 11:00		0			0		
6	27	Early till 9:00							
7	28	Early till 11:00							
8	8			0			24		
9									
10	19		Night till	0			1		Night till
11	20	8:40					2	9:00	
12	20		Night till				7		Night till
13	21	9:00					8	11:00	
14	22		7:00 till						
15	23	10:30							
16	23		6:30 to 8:30						
17	28		Night till						
18	29	7:30							
19	30		Night till						
20	31	10:00							
21	0			0			8	Morning	
22	22		Night till	0			0		
23	23	10:00							
24	26		Night till						
25	27	10:15							
26									
27	27, 28	7:00		0			0		
28	25, 27, 29	Morning		0			0		
29	27	Early till 9:30		0			0		
30	1, 27, 28			0			0		
31	28, 27, 29	7:00		30		9:00	7		9:00
32	27, 28		9:00						
33	27, 28, 29	7:00		0			0		

DIAGRAM VI.- AV. PER CENT OF CLOUDINESS, BY MONTHS, 1894.



[PLATE 805]

TABLE VI.—*Average Per Cent of Cloudiness for Months and Year 1894, at 12 Stations in Michigan; also Average Line for 9 Stations. Average of Observations made Daily at 7 A. M., 2 P. M., and 9 P. M., by observers* for the State Board of Health.*

Stations in Michigan.*	Divisions of the State.†	Average Per Cent of Cloudiness.													
		Year.		Months, 1894.											
		Norm. ‡	1894.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 9 stations.§			54	68	57	55	54	60	41	29	43	41	64	73	63
Rockland.....	U. P.		¶	e 72 a	o 49	g 64 b	s 43 d	r 54 c	p 41 k	u 30 j			j 58	g 91	n 67 a
Traverse City ...	N. W.	60 13	60	84	59	56	60	64	39	27	v 50	q 48	69	95	66
Harrisville	N. E.	60 10	64	78	64	67	48	69	60	28	49	58	77	96	75
Ashton.....	N. C.		**				28	44	15	7 a	9	22	42	50	45 a
Thornville.....	B. & E.	52 18	47	64	51	49	45	58	29	21	39	25	57	67	54
Agr'l College...	C.	58 31	56	64	58	63	61	62	42	29	42	45	67	74	68
Lansing, S. B. of H.	C.	57 16	59	73	64	63	60	65	45	37	41	42	74 f	75	69 b
Albion	S. C.		††	64	59	54	53	55	39				54	63	63
Ann Arbor.....	S. C.	57 15	53	67	57	62 a	62	63	39 c	24 b	35 p	38 h	59	63	60
Battle Creek....	S. C.	48 4	44	57 b	51 i	36	47	47 a	31 e	23 e	32 t	32 h	52 d	59 d	58 a
Tecumseh	S. C.		44	54 d	49 l	43 f	45 h	45 c	25 m	24 p	35 f	38 n	56 d	56 m	57 k
Birmingham ...	S. E.	59 3	59	68	58	55	59	66	56	40	65	42	66	74	64

* The names of observers, their places of observation, and the counties in which these places are situated, are stated in Exhibit 1, page 3.

† The full names of divisions and the counties in each division are stated in Exhibit I., in a paper which follows, on weekly reports of sickness.

‡ Numbers in this column state the average per cent of cloudiness for periods of years ending in each case with Dec. 31, 1894. The small figures above and at the right of numbers which state the per cent of cloudiness, denote the number of years included in the average.

NOTE TO TABLE VI.—Computations of average per cent of cloudiness were made and furnished by the observer at Albion by months in 1894. All other computations in Table VI. were made at the office of the State Board of Health.

§ This line is an average for only the stations at which tri-daily observations were made, and from which statements, nearly complete, were received for every month of the year. It does not include the lines for Rockland, Ashton and Albion.

¶ The average for 10 months is 57. ** For 9 months, 29. †† For 9 months, 56.

a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly above the numbers from which they refer to the notes below.

a For 92 observations.	b For 91 observations.	c For 89 observations.	d For 88 observations.				
e For 87 observations.	f For 86 observations.	g For 85 observations.	h For 84 observations.				
i For 83 observations.	j For 82 observations.	k For 81 observations.	l For 80 observations.				
m For 79 observations.	n For 78 observations.	o For 77 observations.	p For 76 observations.				
q For 75 observations.	r For 73 observations.	s For 72 observations.	t For 70 observations.				
u For 69 observations.	v For 51 observations.						

Graphic representations of 8 representative lines in Table VI., are given in Diagram No. VI., page 42.

EXHIBIT 24.—*Average Per Cent of Cloudiness, by Year and Months in 1894*, Compared with Annual and Monthly Averages for 1893, and for 17 years, 1877-93. These Averages are for Groups of Several Stations in Michigan.*

Years, etc.	Per Cent of Cloudiness.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 17 years, 1877-93.	56	70	65	58	52	50	48	40	42	44	57	69	75
1893 (8 stations)	54	76	65	56	68	50	34	38	30	43	47	65	80
1894 (9 stations)	54	68	57	55	54	60	41	29	43	41	64	73	63
In 1894 Greater than Av. for 17 years, 1877-93	------	----	------	------	2	10	------	------	1	----	7	4	----
In 1894 Less than Av. for 17 years 1877-93	2	2	8	3	------	------	7	11	------	3	------	------	12
In 1894 Greater than in 1893	0	------	------	------	------	10	7	------	13	------	17	8	------
In 1894 Less than in 1893	------	8	8	1	14	------	------	9	------	2	------	------	17

* Mendon for 1877-83; Nirvana for 1877-79 and first four months of 1880; Reed City for last eight months of 1880 and 1881-85; Niles for 1878-81; Benton Harbor for 1877-78 and 1880; Coldwater, Woodmere Cemetery for 1877-79; Otisville for 1878-80, 1882; Washington for 1879-83; Ypsilanti for 1877, 1879; Petoskey for 1878-79; Fife Lake for 1877; Ionia for 1880, 1883-85; Adrian for 1880; Hillsdale for 1880, 1882-84; Parkville for 1881-82; Winfield for 1881, 1883; Mallory Lake for first seven months of 1881, Hudson for last five months of 1881; Hastings for 1882; Port Austin for 1883; Manistique, Swartz Creek for 1884-85; Mackinaw City for 1884-87; Pentwater, East Saginaw for 1886; Kalamazoo for 1877-89; Marquette for 1879-87; Escanaba for 1880-87; Alpena, Grand Haven, Port Huron for 1879-87; Detroit for 1877, 1879-87; Otsego for 1886-87, 1890; Gulliver Lake for 1887-90, 1892; Alma for 1890; Marshall for 1881-92; Rockland for 1891-92; Albion for 1890-91; Thornville for 1877-93; Battle Creek for 1877-85, 1888-89, 1891-93; Lansing for 1879-93; Agricultural College for 1877 1891-93; Ann Arbor for 1880-93; Harrisville for 1882, 1885-93; Traverse City for 1882-93; Birmingham for 1887-93.

EXHIBIT 25.—*Comparison of the Average Per Cent of Cloudiness for the Year, and for each Month of the Year 1894, with Averages for the 30 Years, 1864–93, and for the Year 1893. Observations made at 7 A. M., 2 P. M. and 9 P. M., Daily, by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Michigan.*

Years, etc.	Per Cent of Cloudiness.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 30 years, 1864-93.	58	72	66	61	56	51	50	44	45	47	58	67	75
1893	55	78	66	57	71	52	40	39	32	42	45	62	79
1894	56	64	58	63	61	62	42	29	42	45	67	74	68
In 1894 Greater than Av. for 30 years, 1864-93	------	------	------	2	5	11	------	------	------	----	9	7	----
In 1894 Less than Av. for 30 years, 1864-93	2	8	8	------	------	------	8	15	3	2	------	------	7
In 1894 Greater than in 1893	1	------	------	6	------	10	2	------	10	3	22	12	----
In 1894 Less than in 1893	------	14	8	------	10	------	------	10	------	----	------	------	11

EXHIBIT 26.—*Dates of Auroras observed and recorded at 11 stations in Michigan during the year 1894.*

Stations.	Dates of Auroras recorded in 1894.											
	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Rockland	5	21, 23										
Marquette		22, 23		7, 12, 24	23	24, 26, 29	1, 4, 7, 20, 30	9	27		1, 19, 2.*	5*
Sault Ste. Marie		22, 23	30	6, 12		3, 4, 9, 10						
Traverse City				12	23, 30							
Lansing, S. B. of H.		22, 23	30	12	23				27			
Battle Creek		22, 23										
Thornville	11	23, 24, 25	13, 30		23			11	27			
Kalamazoo			30									
Detroit		23, 23		12, 30								
Port Huron		23										
Ann Arbor		23	30	12					14			

* Auroral light.

MIRAGE.

Mirage began at 8:30 A. M., and faded away about 9:00 A. M., December 25.—*Port Huron.*

METEORS.

July 22, 1 meteor at 9 P. M., course N. W.; Sept. 26, at 9 P. M., course east; Sept. 26, at midnight, course north.—*Lansing.*

EXHIBIT 27.—*Dates of Solar and Lunar Halos*

Line Number.	Stations.	Dates of Halos Recorded.									
		January.		February.		March.		April.		May.	
		Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.
1	Rockland										
2	Marquette	3	19								
3	Sault Ste. Marie				12, 13, 18		14, 16	9, 22	15		
4	Traverse City							25			
5	Lansing, S. B. of H.	28	10, 19	5, 15, 27	15	28		16, 17, 26	14		
6	Kalamazoo	28					14				
7	Parkville								17		
8	Detroit		17		15						

Parhelia, Nov. 17; Dec. 31.—*Rockland.* Nov. 20.—*Thornville.* Jan. 11, 27; Feb. 8, 13, 15, 27; Mar. 15;

EXHIBIT 28.—*Inches of Rain and Melted Snow, by Year and Months in 1894, compared with Annual and Monthly Averages for 1893, and for the 17 Years, 1877-93. These Averages are for Groups of several Stations in Michigan.**

Years, etc.	Inches of Rain and Melted Snow.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 17 years, 1877-93.	35.46	2.23	2.59	2.27	2.60	3.46	3.91	3.11	3.18	3.11	3.24	3.17	2.66
1893 (16 stations)	36.34	2.34	2.78	2.40	4.77	2.91	3.55	2.53	1.22	2.52	4.24	3.05	3.74
1894 (16 stations)	28.74	1.77	1.66	2.09	2.46	6.52	2.76	1.30	.72	3.13	2.76	2.02	1.55
In 1894 Greater than Av. for 17 years, 1877-93						3.06				.02			
In 1894 Less than Av. for 17 years, 1877-93	6.72	.46	.93	.18	.14		1.15	1.81	2.41		.48	1.15	1.11
In 1894 Greater than in 1893						3.61				.61			
In 1894 Less than in 1893	7.60	.57	1.12	.31	2.31		.79	1.53	.50		1.48	1.03	2.19

* Benton Harbor for 1877-78; Mendon for 1877-78, 1880-82; Niles for 1878-81; Nirvana for 1877-79, and to and including April 25, 1880; Reed City from April 26 to December 31 inclusive in 1880, and for 1881-95; Coldwater, Woodmere Cemetery for 1877-79; Otisville for 1878-80, 1882; Escanaba for 1880-87; Washington for 1880-83; Fife Lake, Ypsilanti for 1887; Winfield for 1881-83; Mallory Lake for first seven months of 1881, Hudson for last five months of 1881; Hastings for 1882; Hillsdale for 1882-84; Ionia for 1883-84; Manistique, Swarts Creek for 1884-85; Mackinaw City for 1884-87; Pentwater, East Saginaw for 1886; Gulliver

ded on the Monthly Registers in 1894.

, 1894.

ne.	July.		August.		September.		October.		November.		December.		Line Number.
Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	
.....										10			1
.....								10		11		13	2
.....											6.	6	3
.....													4
.....			16				1	11	3		5, 15, 18	6	5
.....													6
.....													7
.....													8

Nov. 28: Dec. 13, 27.—*Lansing.* Mar. 26, 27.—*Kalamazoo.* Nov. 1.—*Parkville.*

BIT 29.—*Comparison of the Rainfall during the Year and during each Month e Year 1894, with that for the Year 1893, and with the Average for the 30 Years. -93. Observations made by Prof. R. C. Kedzie, at the State Agricultural College, Lansing, Michigan.*

ars, etc.	Inches of Rain and Melted Snow.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
years, 1864-93.	31.40	1.80	2.04	2.42	2.43	3.22	4.08	3 12	2.80	2.79	2.52	2.30	1.91
.....	31.29	1.78	1.83	2.82	4.81	2 86	4.85	1.86	.56	1.84	3.61	2.19	2.23
.....	19.30	1.37	.53	1.25	2.76	4.83	1.30	.66	0	2.59	1.91	.97	.93
94 Greater Av. for 30 , 1864-93 .					.33	1.61							
4 Less than for 30 years, 93.....	12.10	.43	1.51	1.17			2.78	2.26	2.80	.20	.61	1.33	.98
94 Greater in 1893.....						1 97				.75			
Less than in	11.99	.41	1.30	1.57	2.05		3.55	1.00	.56		1.70	1.22	1.33

r 1887-90, 1892; Alma, Otsego for 1890; Hudson for 1886, 1888-89; Battle Creek for 1877-78, 1884, 1888 e for 1889-92; Marshall for 1881-84, 1886-93; Rockland for 1891; Thornville, Detroit for 1877-93; soo for 1877-90, 1892-93; Agricultural College for 1877-78, 1881-93; Marquette for 1879-84, 1886-93; Port Huron for 1879-93; Grand Haven for 1879-88, 1890-93; Lansing for 1880-93; Harrisville fo 1887-93; Ann Arbor for 1881-82, 1885-86; 1888-93; Traverse City for 1882-93; Parkville for 1882-83 Birmingham for 1887-93; Sault Ste. Marie for 1892-93.

TABLE VII.—*Inches of Rain and Melted Snow for Months and Year 1894, at 19 Stations in Michigan; Also Average Line for 16 Stations,—as compiled from daily observations made by observers* for the State Board of Health, and for the U. S. Weather Bureau.*

Stations in Michigan.* (Those of the U. S. Weather Bureau in Italics.)	Divisions of the State.†	Inches of Rain and Melted Snow.													
		Year.		Months, 1894.											
		Norm. ‡	1894.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 16 Stations §			28.74	1.77	1.66	2.09	2.46	6.52	2.76	1.30	0.72	3.13	2.76	2.02	1.55
Rockland	U. P.		‖	0.80		2.60	1.80	7.53	4.20	0.50	0.60	2.70	5.85	2.50	2.80
Marquette	U. P.	31.96 [9]	35.58	2.77	2.03	4.14	1.73	8.09	1.90	1.57	1.78	2.73	2.00	4 58	2.26
Sault Ste. Marie	U. P.	36.06 [3]	38.53	3.82	0.80	3.97	1.10	3.38	2.53	1.95	4.72	3.24	4.74	5.11	3.07
Traverse City	N. W.	37.95 [13]	32.92	3.35	1.28	3.28	2.18	5 89	3.70	1.13	0.78	2.82	4.14	2.84	1.53
Alpena	N. E.	35.81 [22]	30.88	1.59	0.90	1.73	2.06	5.99	7.19	0.91	1.53	2.64	3.18	1.41	1.75
Harrisville	N. E.	33.67 [8]	32.31	1.30	1.92	2.96	1.64	8.08	4.35	1.01	0.31	3.20	3.04	2.39	2.11
Grand Haven	W.	31.01 [5]	32.61	2.74	1.15	3.40	2.57	6.35	2.82	0.57	0,68	6.56	2.66	1.86	1.25
Ashton	N. C.		¶				2.35	7.17	4.10	0.64	0.49	4.19	3.10	1.17	1.37
Port Huron	B. & E.	32.14 [20]	26.94	0.86	2.88	1.28	2.28	6.97	3.38	0.65	0.07	3.73	2.13	1.43	1.28
Thornville	B. & E.	32.90 [18]	23.31	0.99	1.29	0.69	1 76	6.09	1.86	2.36	0.18	3.44	2.81	1.18	0.66
Agricultural College	C.	31.00 [31]	19.30	1.37	0.53	1.25	2.76	4.83	1.80	0.86	0	2.59	1.91	0.97	0.93
Lansing, S. B. of H.	C.	33.44 [15]	24.69	1.75	1.67	1.26	3.31	6.51	1.81	1.45	0	2.76	1.98	1.05	1.14
Albion	S. C.		**	2.24	2.66	1.51	3.05	6.40	6.26				2.29	1.58	2.65
Ann Arbor	S. C.	30.79 [7]	24.96	1.06	1.27	2.06	2.78	5.93	1.93	0.83	0	3.66	2.79	1.18	1.47
Kalamazoo	S. C.	31.38 [3]	26.06	1.57	0.98	1.30	2.34	8.33	1.64	1.34	0.91	1.64	2.53	2.40	1.08
Parkville	S. C.	42.71 [14]	30.42	1.68	1.97	1.92	3.95	7.23	2.03	1.39	0.34	4.09	2.50	1.89	1.38
Tecumseh	S. C.		29.00	1.31	2.96	1.18	3.28	8.12	2.27	0.88	0	2.54	3.03	1.71	1.74
Birmingham	S. E.	30.96 [8]	26.73	1.26	2.47	1.70	3.03	7.55	2.80	1.88	0	1.85	1.40	1.15	1.64
Detroit	S. E.	32.88 [23]	25.65	0.94	2.50	1.39	2.54	4.90	2.61	2.06	0.16	2.47	3.37	1.15	1.56

* The names of observers, their places of observation, and the counties in which these places are situated, are stated in Exhibit 1, page 2.

† The names of divisions, and the counties in each, are stated in Exhibit I., in a paper which follows on weekly reports of sickness.

‡ Numbers in this column state the annual average rainfall for periods of years ending in each case with December 31, 1894. The small figures above and at the right of numbers which state the rainfall denote the number of years included in the average.

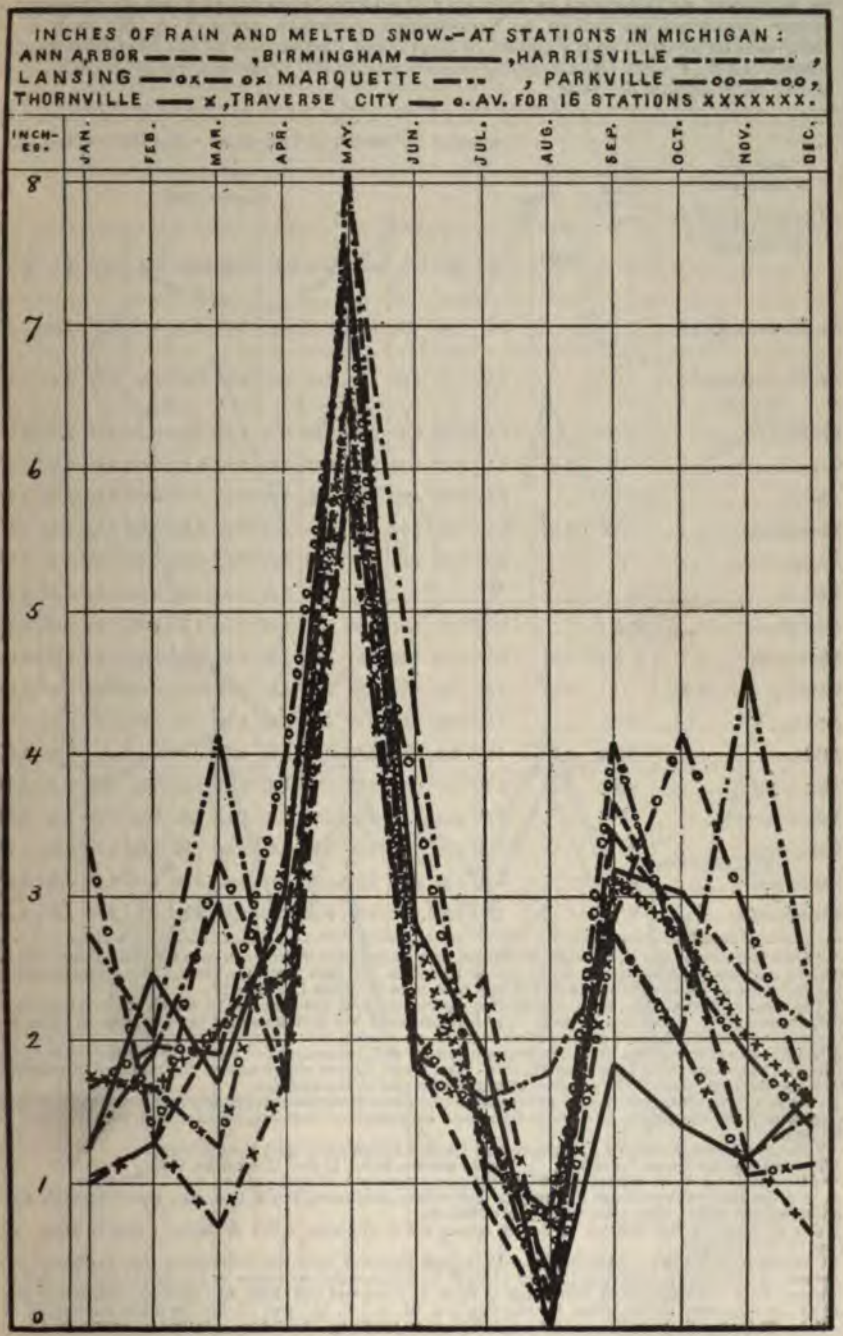
§ This line is an average for only the stations from which statements, nearly complete, are given for every month of the year. It does not include Rockland, Ashton and Albion.

‖ The total rainfall for 11 months is 31.38 inches. ¶ For 9 months, 24.61 inches. ** For 9 months, 28.64 inches.

NOTE.—The computations of amount of rainfall were furnished by the observers at Detroit, Alpena, Grand Haven, Port Huron, Ann Arbor, Albion, Kalamazoo, Sault Ste. Marie and Marquette for the year. All other computations in Table VII., were made in the office of the Secretary of the State Board of Health.

The lines for 8 representative stations in Table VII., are graphically represented in Diagram VII., page 49.

DIAGRAM VII.- RAINFALL, BY MONTHS IN 1894.



[PLATE 106]

TABLE VIII.—*Relative amount of Ozone in the Atmosphere by Day, for Months and Year 1894, at 16 Stations, also Average lines for 9 Stations and for 4 Stations in Michigan, as indicated by averages of observations made daily by exposing Test-paper prepared according to Schönbein's formula, from 7 A. M. to 2 P. M.—Recorded according to a scale of 10 Degrees of Coloration of the Test-paper (greatest coloration by Ozone equals 10) by observers for the State Board of Health, and for the U. S. Weather Bureau.**

Stations in Michigan.† (Those of the U. S. Weather Bureau In Italics.)	Divisions of the State. †	Degrees of Coloration of Test-paper.—Day Observation.**													
		Year.		Months, 1894.											
		Norm. ‡	1894	Jan.	Feb.	Mar.	Apr.	May.	Jun.	July.	Aug.	Sept.	Oct.	Nov. i	Dec.
Av. for 9 Stations §			3.95	4.33	4.68	4.60	4.23	4.60	3.82	3.33	4.21	3.37	3.46	3.41	3.51
Av. for 4 Stations ‖			2.78	2.54	2.87	2.58	3.03	3.35	3.30	2.65	3.84	2.69	2.45	1.84	2.26
Rockland	U. P.		5.54	a 6.50	f 6.10	b 6.47	g 5.50	g 5.71	5.64	d 4.83	h 6.23	c 5.42	a 5.77	b 5.96	e 6.50
Traverse City	N. W.	4.83^{13}	6.73	6.47	6.93	6.79	6.77	7.02	7.30	6.82	a 7.58	6.41	6.50	6.12	6.08
Alpena	N. E.		3.54	4.70	4.29	3.73	3.87	3.96	3.74	2.87	3.08	3.18	3.01	2.49	3.60
Harrisville	N. E	4.02^{10}	3.07	3.41	2.83	3.28	3.34	3.73	3 37	2.75	3.18	2.04	2.59	3.12	3.15
Grand Haven	W.		4.67	2.70	3.38	3.20	5.57	5.89	6.37	5.33	6.88	5.48	5.24	3.02	2.98
Ashton	N. C.		¶				5.40	5 44	4.00	3.88	5.18	4.64	5.56	5.56	6.08
Port Huron	B. & E		1.50	1.05	1.51	1.63	1.24	1.89	2.14	1.79	3.40	1.34	0.63	0.73	0.70
Thornville	B. & E.	2.99^{18}	3.25	5.18	5.43	4.31	3.04	3.35	1.80	0.62	1.89	1.51	2.85	3.99	4.98
Lansing, S. B. of H.	C.	3.18^{16}	2.82	1.83	2.79	3.24	2.74	3.83	3.54	3.11	3.89	3.08	2.11	1.86	1.79
Adrian	S. C.		2.58	3.83	4.04	4.18	3.04	3.35	1.94	1.33	2.50	1.38	g 2.11	1.76	e 1.54
Albion	S. C.		††	3.25	3.65	3.60	3.57	2.99	3.64				2.43	1.62	1.70
Ann Arbor	S. C.	2.98^{2}	3.22	2.57	3.22	3.89	3.94	4.02	3.37	2.98	3.92	4.11	2.40	2.45	1.73
Battle Creek	S. C.		3.38	4.05	5.34	3.99	4.64	5.09	b 3.12	2.95	3.56	2.71	1.92	1.52	1.63
Kalamazoo	S. C.		1.41	1.70	2.29	1.76	1.44	1.67	0.94	0.62	1.98	0.74	0.92	1.12	1.76
Tecumseh	S. C.		4.74	5.09	5.40	5.21	5.10	5.35	4.30	4.59	5.18	3.68	4.89	3.89	4.15
Birmingham	S. E.		‡‡	2.96	2.18	2.34	2.20	3.22	2.44	1.56		1.88	1.89	b 1.48	2.05

* At the stations of the U. S. Weather Bureau and Kalamazoo during the year 1894, the observations were made by exposing the test-paper from 8 A. M. to 8 P. M., all 75th Meridian time. The corresponding local time for some of these stations is stated in a foot-note to Table II., page 22.

† The names of observers, their places of observation, and the counties in which these places are situated, are stated in Exhibit 1, page 2. The full names of the divisions and the counties in each division are stated in Exhibit I., in a paper which follows, on weekly reports of sickness.

‡ Numbers in this column state the average annual relative amount of ozone by day for periods of years ending in each case with December 31, 1894. The small figures above and at the right of numbers which state the average, denote the number of years included in the average.

§ This line is an average for only the stations from which statements, nearly complete, were received for every month in the year. It does not include Birmingham, Ashton, Albion, and the Weather Bureau Stations.

‖ This is an average line for Alpena, Grand Haven, Kalamazoo, and Port Huron.

¶ The average for 9 months is 5.08. †† For 9 months, 3.05. ‡‡ For 11 months, 2.20.

** Allowance has been made for difference in sensitiveness of test-paper. See "i" below.

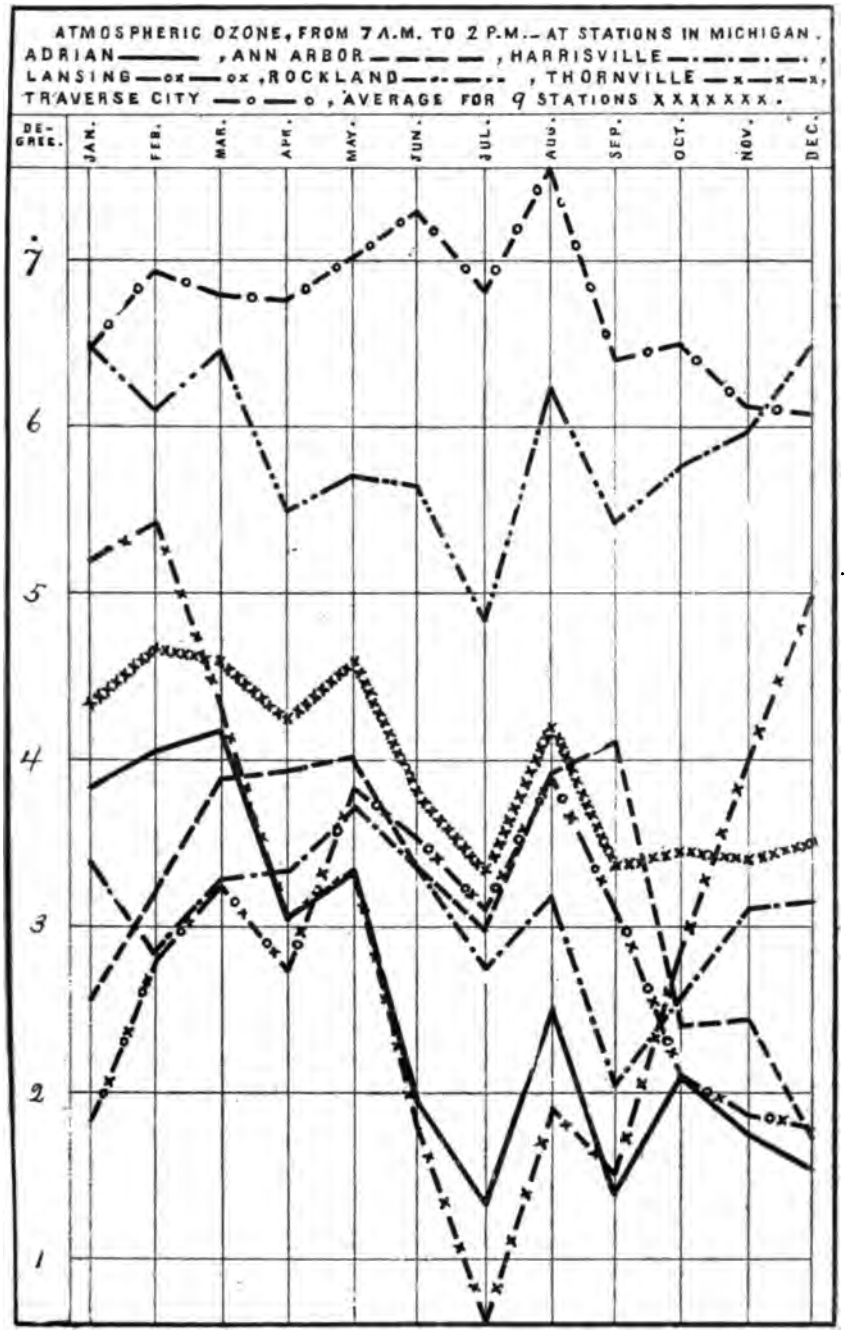
a, b, c. In the columns from January to December, inclusive, the a, b, c, etc., stand directly above the numbers from which they refer to the notes below.

a For 30 days. b For 29 days. c For 28 days. d For 27 days. e For 25 days. f For 24 days. g For 23 days. h For 20 days.

i CONCERNING OZONE CORRECTIONS.—It is now believed that the correction (for variation in sensitiveness of different lots of test-paper) applied to the monthly averages in the tables for the day and the night ozone, for the month of November in each of the years 1891, 1892, and 1893, at stations in Michigan and at Lansing, was .39 too great for the day (7 A. M. to 2 P. M.) and .54 for the night ozone (2 P. M. to 9 P. M.). This should be taken into consideration in studying the tables relative to ozone in the Annual Reports of this Board for those years.

Eight lines in this table are represented in Diagram VIII., page 51.

DIAGRAM VIII.- OZONE, AVERAGE BY DAY, MONTHS IN 1894.



[PLATE 807]

TABLE IX.—*Relative Amount of Ozone in the Atmosphere at Night for Months and Year 1894, at 16 Stations, also Average Lines for 9 Stations and for 4 Stations in Michigan,—as indicated by Averages of Observations made Nightly by exposing Test-paper, prepared according to Schönbein's formula, from 9 P. M. to 7 A. M.,—Recorded according to a scale of 10 Degrees of Coloration of the Test-paper (greatest coloration by Ozone equals 10), by observers for the State Board of Health, and for the U. S. Weather Bureau.**

Stations in Michigan.† (Those of the U. S. Weather Bureau in Italics.)	Divisions of the State.‡	Degrees of Coloration of Test-paper.—Night Observation.**													
		Year.		Months, 1894.											
		Norm. §	1894.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 9 Stations ‖			4.31	4.21	4.86	4.62	4.62	5.03	4.64	4.07	4.16	3.67	3.70	3.87	4.23
Av. for 4 Stations ¶			3.38	2.87	3.46	3.90	3.61	3.74	3.97	3.09	3.49	3.24	2.88	2.92	3.37
Rockland	U. P.		6.14	a 6.45	e 6.78	a 6.82	d 6.62	f 6.38	a 6.84	c 5.80	h 6.28	c 5.74	a 6.80	d 6.46	b 7.24
Traverse City	N. W.	4.78[13]	6.54	5.96	6.87	6.89	6.87	a 7.26	a 7.33	7.03	6.46	5.44	5.59	6.26	6.47
Alpena	N. E.		4.49	5.41	5.94	5.79	4.74	4.38	4.04	3 71	3.83	3.98	3.40	3.76	4.90
Harrisville	N. E.	4.56[10]	3.29	3.21	3.54	3.63	3.57	3.80	3.58	3.13	3 30	2.71	2.62	2.82	3.54
Grand Haven	W.		4.70	3.01	3.37	4.55	5.29	5.23	6.51	4.82	4.93	5.33	4.72	4.42	4.20
Ashton	N. C.		††				5.47	5.48	4.41	4.48	5.49	4.84	5.59	5.62	6.18
Port Huron	B. & E.		1.54	0.73	1.47	1.96	1.34	2.09	2.44	1.67	2.30	1.24	1.24	1.13	0.90
Thornville	B. & E.	3.66[18]	4.75	5.25	6.26	5.50	5.50	5.61	4.48	2.71	3.39	3.54	3.85	5.06	5.80
Lansing, S. B. of H.	C.	3.54[16]	3.22	1.92	3.19	3.02	2.97	4.90	4.64	3.80	2.91	3.28	2.59 g	2.56	2.88 e
Adrian	S. C.		3.22	4.50	4.83	4.47	4.24	3.90	2.48	2.22	2.88	1.84	2.60	2.22	2.30
Albion	S. C.		‡‡	3.37	4.47	3.99	3.60	3.96	3.11				2.11	2.22	2.70
Ann Arbor	S. C.	2.84[2]	2.99	2.18	3.65	3.86	3.84	4.02	3.34 a	2.67	2.78	3.18	1.72	2.59	2.09
Battle Creek	S. C.		2.70	3.44	2.97	1.54	2.04	2.96	3.22	3.61	3.49	2.28	2.75	1.66	2.44
Kalamazoo	S. C.		2.78	2.31	3.04	3.31	3.07	3.25	2.88	2.16	2.91	2.41	2.17	2.38	3.46
Tecumseh	S. C.		5.58	4.99	5.62	5.83	5.94	6.41	5.84	5.64	5.98	5.04	5.30	5.16 a	5.15
Birmingham	S. E.		§§	2.44	2.37	2.28	2.20	3.22	2.64	1.87		2.28	2.11	1.35 a	2.44

* At the U. S. Weather Bureau Stations and Kalamazoo during the year 1894, the observations were made by exposing the test-paper from 8 P. M. to 8 A. M., 75th meridian time. The corresponding local time for some of these stations is stated in a foot-note to Table II., page 22.

† The names of observers, their places of observation, and the counties in which these places are situated, are stated in Exhibit I, page 2.

‡ The full names of the divisions and the counties in each division are stated in Exhibit I., in a paper which follows, on weekly reports of sickness.

§ Numbers in this column state the average annual relative amount of ozone by night for periods of years ending in each case with December 31, 1894. The small figures above and at the right of the numbers which state the average, denote the number of years included in the average.

‖ This line is an average for only the stations from which statements, nearly complete, were received for every month in the year. It does not include Ashton, Albion, Birmingham, and the U. S. Weather Bureau Stations.

¶ This is an average line for Kalamazoo, Alpena, Grand Haven, and Port Huron.

** Allowance has been made for difference in sensitiveness in test-paper. See "1" foot-note, Table VIII., page 50.

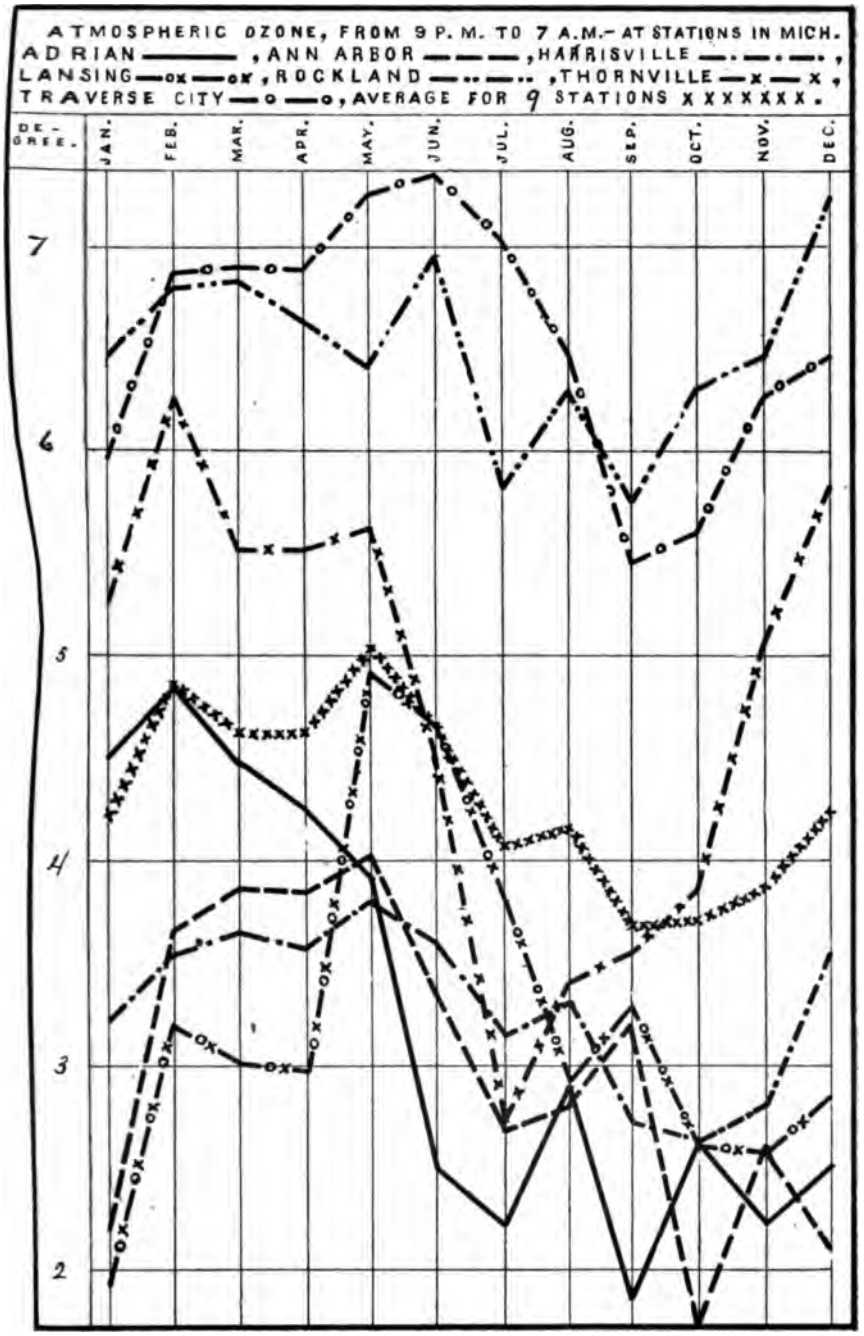
†† The average for 9 months is 5.28. ‡‡ For 9 months, 3.23. §§ For 11 months, 2.29.

a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly above the numbers from which they refer to the notes below.

a For 29 days. b For 28 days. c For 27 days. d For 26 days. e For 25 days. f For 24 days. g For 21 days. h For 20 days.

Eight lines in this table are graphically represented in Diagram IX., page 53.

DIAGRAM IX.- OZONE, AVERAGE BY NIGHT, MONTHS IN 1894.



[PLATE 808]

EXHIBIT 30.—*Average Amount of Atmospheric Ozone (Day), by Year and Months, in 1894, compared with Annual and Monthly Averages for 1893, and for the 17 Years, 1877-93. These Averages are for Groups of Several Stations in Michigan.*

Years, etc.	Ozone by Day.—Degrees of Coloration of Test-paper.*												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 17 years, 1877-93†	3.42	3.60	3.71	3.73	3.54	3.63	3.45	3.02	3.32	3.14	3.16	3.20	3.45
1893 (5 stations).....	3.94	4.02	4.54	4.30	3.92	4.18	3.98	3.50	4.56	3.84	3.70	3.42	3.81
1894 (9 stations).....	3.95	4.33	4.68	4.60	4.23	4.60	3.82	3.33	4.21	3.37	3.46	3.41	3.51
In 1894 Greater than Av. for 17 years, 1877-93.....	.53	.73	.97	.87	.69	.97	.37	.31	.89	.23	.30	.21	.06
In 1894 Less than Av. for 17 years, 1877-93.....													
In 1894 Greater than in 1893.....	.01	.31	.14	.30	.31	.42				.03			
In 1894 Less than in 1893.....							.16	.17	.35		.24	.01	.30

*In this exhibit allowance has been made for difference in sensitiveness of different lots of test-paper.
†Mendon for 1877-83; Niles for 1878-81; Nirvana for 1877-79 and to and including April 25, 1880; Reed City for April 26 to end of year 1880 and for 1881-85; Coldwater, Agricultural College for 1877-78, 1880; Otisville for 1878-80; Washington for 1879-83; Petoskey, Woodmere Cemetery for 1878-79; Fife Lake, Ypsilanti for 1877; Ionia for 1880, 1883-84; Adrian for 1880; Mallory Lake for first seven months of 1881, Hudson for last five months of 1881; Hastings for 1882; Hillsdale for 1882-84; Parkville for 1882; Port Austin for 1883-85, 1888-89; Winfield for 1883; Manistique, Mackinaw City, Swartz Creek for 1884-85; Pentwater for 1886; Kalamazoo for 1877-88; Alpena for 1879-87; Marquette for 1880-81, 1883-84, 1886-87, Grand Haven for 1880-84; Escanaba for 1881-85, 1887; Port Huron for 1881-85; Otsego for 1890; Tecumseh for 1877-85; Marshall for 1881-92; Rockland for 1891-92; Albion for 1890-91; Battle Creek for 1877-80, 1882-84, 1892-93; Thornville for 1877-93; Lansing for 1879-93; Harrisville for 1881-82, 1885-93; Traverse City for 1882-93; Birmingham for 1886-89; Ann Arbor for 1880-91, 1893.

EXHIBIT 31.—*Average Amount of Atmospheric Ozone (Night), by Year and Months, in 1894, compared with Annual and Monthly Averages for 1893, and for the 17 Years, 1877-93. These Averages are for Groups of Several Stations in Michigan.**

Years, etc.	Ozone by Night.—Degree of Coloration of Test-paper.†												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 17 years, 1877-93.	3.56	3.94	4.25	4.20	3.91	3.81	3.55	2.94	3.07	2.91	3.26	3.42	3.81
1893 (5 stations).....	4.24	4.03	4.92	4.92	4.62	4.55	4.15	3.66	4.56	3.24	3.91	3.81	4.53
1894 (9 stations).....	4.31	4.21	4.86	4.62	4.62	5.03	4.64	4.07	4.16	3.67	3.70	3.87	4.23
In 1894 Greater than Av. for 17 years, 1877-93 ...	.75	.27	.61	.42	.71	1.22	1.09	1.13	1.09	.76	.44	.45	.42
In 1894 Less than Av. for 17 years, 1877-93.....													
In 1894 Greater than in 1893.....	.07	.18			0	.48	.49	.41		.43		.05	
In 1894 Less than in 1893.....			.06	.30					.40		.21		.30

*The stations represented in Exhibit 31, are the same as those represented in Exhibit 30, relative to day ozone, and named in foot-note of that exhibit.
†In this exhibit allowance has been made for difference in sensitiveness of different lots of test-paper.

OBSERVATIONS FOR OZONE AT LANSING.

Since July 1, 1884, the observations for ozone at Lansing have been taken at the new shelter for meteorological instruments in the southwest part of the Capitol yard. Previous to July 1, 1884, the observations had been taken at the office window. Exhibit E, page 60, of the report for 1885, shows that the average for the month of July, 1884, is greater at each observation—7 A. M. to 2 P. M., 2 P. M. to 9 P. M., and 9 P. M. to 7 A. M., at the shelter for instruments than at the office window. Possibly this fact should be taken into consideration in studying ozone at Lansing through a long period of years.

EXHIBIT 32.—*Average Velocity of the Wind in Miles per hour, by Year and Months, in 1894, compared with Annual and Monthly Averages for 1893, and for the 12 years, 1882-93. From Registers of the Robinson's Self-Registering Anemometer.* These Averages are for Groups of several Stations in Michigan.*

Years, etc.	Average Miles per Hour.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 12 years, 1882-93	9.6	10.8	10.7	10.4	10.5	9.4	7.8	7.8	7.6	8.6	9.5	10.7	11.1
1893 (8 stations)	10.2	9.7	11.7	11.7	13.2	9.8	8.2	8.2	7.6	9.2	10.6	11.3	11.7
1894 (8 stations)	10.1	10.8	11.7	12.4	9.8	10.5	7.8	8.2	7.3	9.1	9.7	12.0	11.4
In 1894 Greater than Av. for 12 years, 1882-93	.5	0	1.0	2.0		1.1	0	4		.5	.2	1.3	.3
In 1894 Less than Av. for 12 years, 1882-93					.7				.3				
In 1894 Greater than in 1893		1.1		.7		.7						.7	
In 1894 Less than in 1893	.1				3.4		.4		.3	.1	.9		.3

*Gibbon's Anemometer was used at Ann Arbor.

EXHIBIT 33.—*Average Velocity of the Wind in Miles per hour, by Months for the Years 1880-93, and comparisons of 1894 with this Average and with the year 1893. From Registers of the Robinson's Self-Registering Anemometer in the Office of the State Board of Health, State Capitol, Lansing, Michigan.*

Years, etc.	Miles, by Self-Registering Anemometer.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 14 years, 1880-93	9.7	11.0	11.4	11.0	11.2	9.6	8.2	7.8	7.2	8.5	8.9	10.8	11.3
1893	10.2	10.4	13.0	12.4	14.2	9.3	7.5	8.1	6.1	9.0	10.6	10.8	11.2
1894	10.4	11.5	12.3	13 8	9.8	10.2	8.2	8.6	7.1	9.1	10.1	12.0	11.5
In 1894 Greater than Av. for 14 years, 1880-93	.7	.5	.9	2.8		.6	0	.8		.6	1.2	1.2	.2
In 1894 Less than Av. for 14 years, 1880-93					1.4				.1				
In 1894 Greater than in 1893	.2	1.1		1.4		.9	.7	.5	1.0	.1		1.2	.3
In 1894 Less than in 1893			.7		4.4						.5		

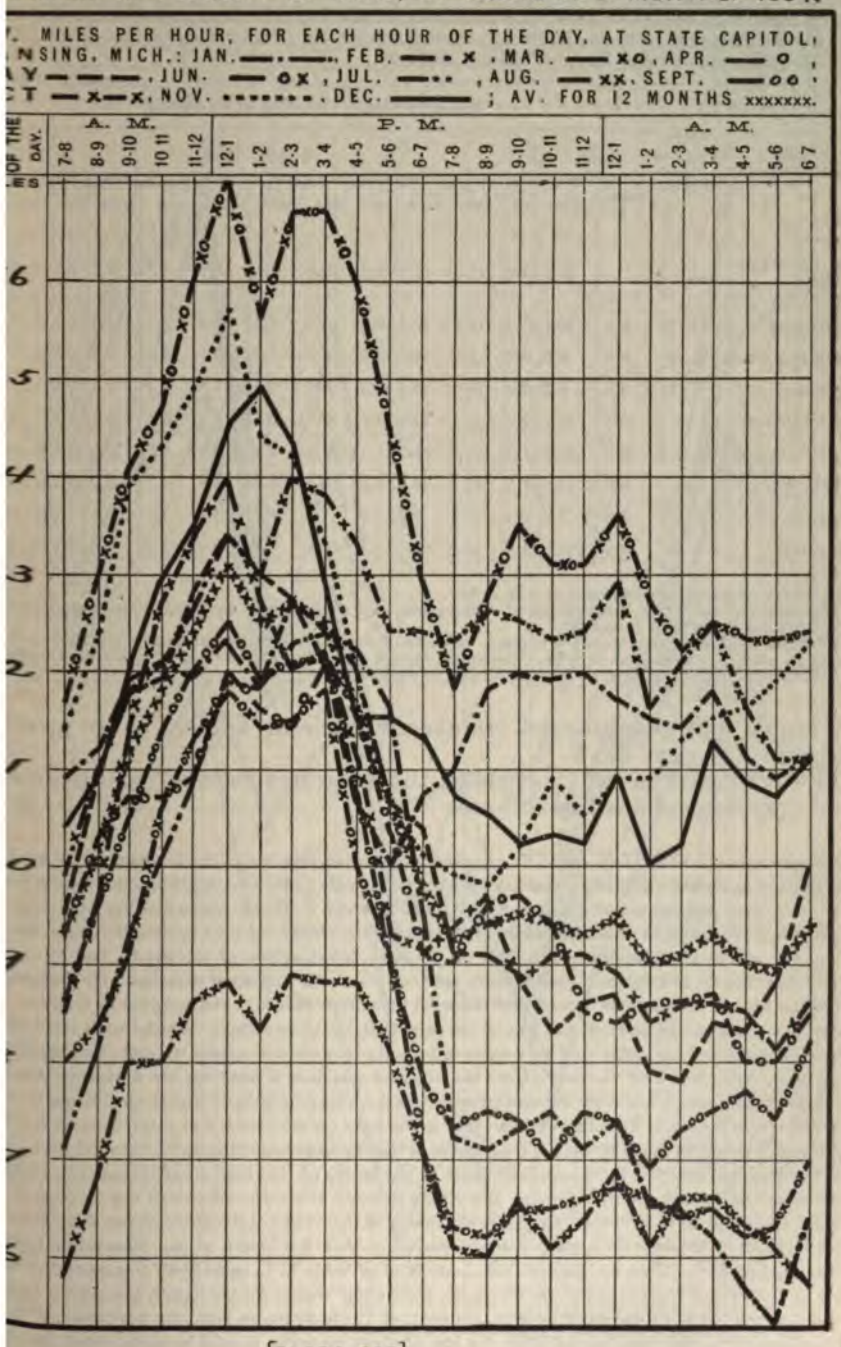
TABLE X.—*Average Velocity of the Wind in Miles per Hour, for each Hour of the Day, by Months of the Year 1894. Compiled from Registers of the Robinson's Self-Registering Anemometer, exposed above the roof of the Capitol, and registering in the office of the State Board of Health, Lansing, Michigan.*

Months.	Averages.			Hours (1894) and Average Miles per Hour.																							
				A. M.					P. M.												A. M.						
	Av. 15 years, 1880-94.	1893.	1894.	7-8	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5	5-6	6-7
Year	9.8	10.2	10.4	9.3	10.2	11.2	11.8	12.4	13.1	12.5	12.7	12.5	11.6	10.6	9.8	9.2	9.4	9.5	9.4	9.3	9.5	9.0	9.1	9.3	9.0	8.9	9.4
January	11.0	10.4	11.5	10.9	11.2	11.9	12.1	11.9	12.3	11.8	12.7	12.0	10.6	10.0	10.7	11.0	11.8	12.0	11.9	12.0	11.7	11.5	11.4	11.8	11.1	10.9	11.2
February	11.4	13.0	12.3	9.9	11.0	11.8	12.1	12.6	13.4	13.0	14.0	13.8	13.3	12.4	12.4	12.3	12.6	12.5	12.3	12.4	12.9	11.6	12.1	12.5	11.6	11.1	11.1
March	11.2	12.4	13.8	11.7	13.0	14.1	14.7	16.0	17.0	15.6	16.7	16.7	16.0	14.5	12.9	11.8	12.8	13.5	13.1	13.1	13.6	12.7	12.2	12.5	12.3	12.3	12.4
April	11.1	14.2	9.8	9.3	10.3	10.7	10.7	10.9	12.0	11.6	11.4	12.1	11.5	10.3	9.1	9.0	9.6	9.7	9.4	8.5	8.4	8.6	8.6	8.7	8.0	8.0	8.5
May	9.6	9.3	10.2	9.5	11.0	11.8	11.9	12.8	13.4	13.0	12.7	12.4	12.0	10.6	10.4	9.1	9.1	8.9	8.3	8.6	8.7	7.9	7.8	8.4	8.3	8.8	10.0
June	8.2	7.5	8.2	8.0	8.4	9.1	10.6	11.3	11.8	11.4	11.5	11.8	10.0	9.1	7.1	6.3	6.2	6.5	6.5	6.6	6.7	6.6	6.4	6.5	6.2	6.3	7.0
July	7.9	8.1	8.6	7.1	8.1	9.3	10.1	10.9	11.9	11.8	12.3	12.4	12.2	11.6	9.5	7.2	7.1	7.3	7.5	7.1	7.4	6.5	6.5	6.2	5.7	5.3	6.4
August	7.2	6.1	7.1	5.8	6.8	8.0	8.0	8.6	8.8	8.3	8.9	8.8	8.8	8.1	7.0	6.1	6.0	6.6	6.1	6.4	6.9	6.1	6.6	6.6	6.3	6.1	5.7
September	8.5	9.0	*9.1	8.6	9.6	10.5	11.4	12.0	12.5	11.9	12.1	12.1	10.7	8.9	7.8	7.3	7.5	7.4	7.0	7.5	7.4	6.9	7.3	7.5	7.7	7.4	8.2
October	9.0	10.6	10.1	8.5	9.7	11.4	12.7	13.4	14.0	12.7	12.0	12.2	11.1	9.3	9.1	9.4	9.7	8.8	9.1	9.1	8.9	8.4	8.6	8.6	8.5	8.1	8.6
November	10.9	10.8	12.0	11.4	12.4	13.9	14.3	14.9	15.7	14.4	14.2	13.3	12.0	10.6	10.1	9.9	9.8	10.2	10.9	10.5	10.9	10.9	11.3	11.5	11.6	11.9	12.3
December	11.3	11.2	11.5	10.4	10.9	12.1	13.0	13.5	14.5	14.9	14.3	12.9	11.5	11.5	11.3	10.7	10.5	10.2	10.3	10.2	10.9	10.0	10.2	11.3	10.8	10.7	11.1

*For only about 29 days.

The statements in the third figure column in Table X. of the average velocity of the wind in miles per hour, by months, during the year 1894, are graphically represented in Diagram XI., page 59. The remaining columns of Table X. for 1894, are graphically represented in Diagram X., page 57.

AGRAM X.—VELOCITY OF WIND, BY HOURS AND MONTHS. 1894.



[PLATE 509]

TABLE XI.—*Average Velocity of the Wind in Miles per Hour for the Year an each month of the Year 1894, at 8 Stations in Michigan. Computed from Reg of the Robinson's Self-Registering Anemometer,* by Observers for the State of Health, and for the U. S. Weather Bureau.*

Stations in Michigan.†	Divisions of the State.	Miles, by Self-Registering Anemometer.												
		Year.		Months, 1894.										
		Norm. ‡	1894.	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug	Sept.	Oct.	No
Av. for 8 stations			10.1	10.8	11.7	12.4	9.8	10.5	7.8	8.2	7.[illegible]	9.1	9.7	12
Marquette	U. P.	9.4^{9}	10.6	10.3	11.[illegible]	12.1	9.9	12.0	7.8	9.3	9.[illegible]	11.7	11.4	12
Sault Ste. Marie	U. P.	8.6^{3}	8.5	9.2	8.9	10.1	8.9	9.6	6.9	6.5	6.[illegible]	7.7	9.0	10
Alpena	N. E.	9.8^{4}	9.9	10.4	11.7	12.3	10.3	10.6	7.8	7.5	7.4	8.4	9.3	11
Grand Haven	W.	10.7^{5}	10.9	12.4	13.4	13.8	10.4	10.6	7.8	8.5	7.5	9.4	10.5	12
Port Huron	B. & E.	10.5^{13}	11.7	12.1	14.[illegible]	13.9	11.1	12.9	9.0	9.2	9.3	10.6	10.6	14
Lansing, S. B. of H.	C.	9.8^{15}	10.[illegible]	11.5	12.3	13.8	9.8	10.[illegible]	8.[illegible]	8.6	7.1	8.9	10.1	12
Ann Arbor	S. C.	8.6^{12}	7.6	8.4	9.2	9.8	7.5	7.4	5.5	6.5	4.[illegible]	6.1	6.7	10
Detroit	S. E.	9.9^{13}	11.0	11.9	13.3	13.7	10.[illegible]	10.8	9.0	9.2	7.6	9.9	10.3	13

* Gibbon's Anemometer was used at Ann Arbor.

† The names of observers, their places of observation, and the counties in which these places a ated are stated in Exhibit 1, page 2.

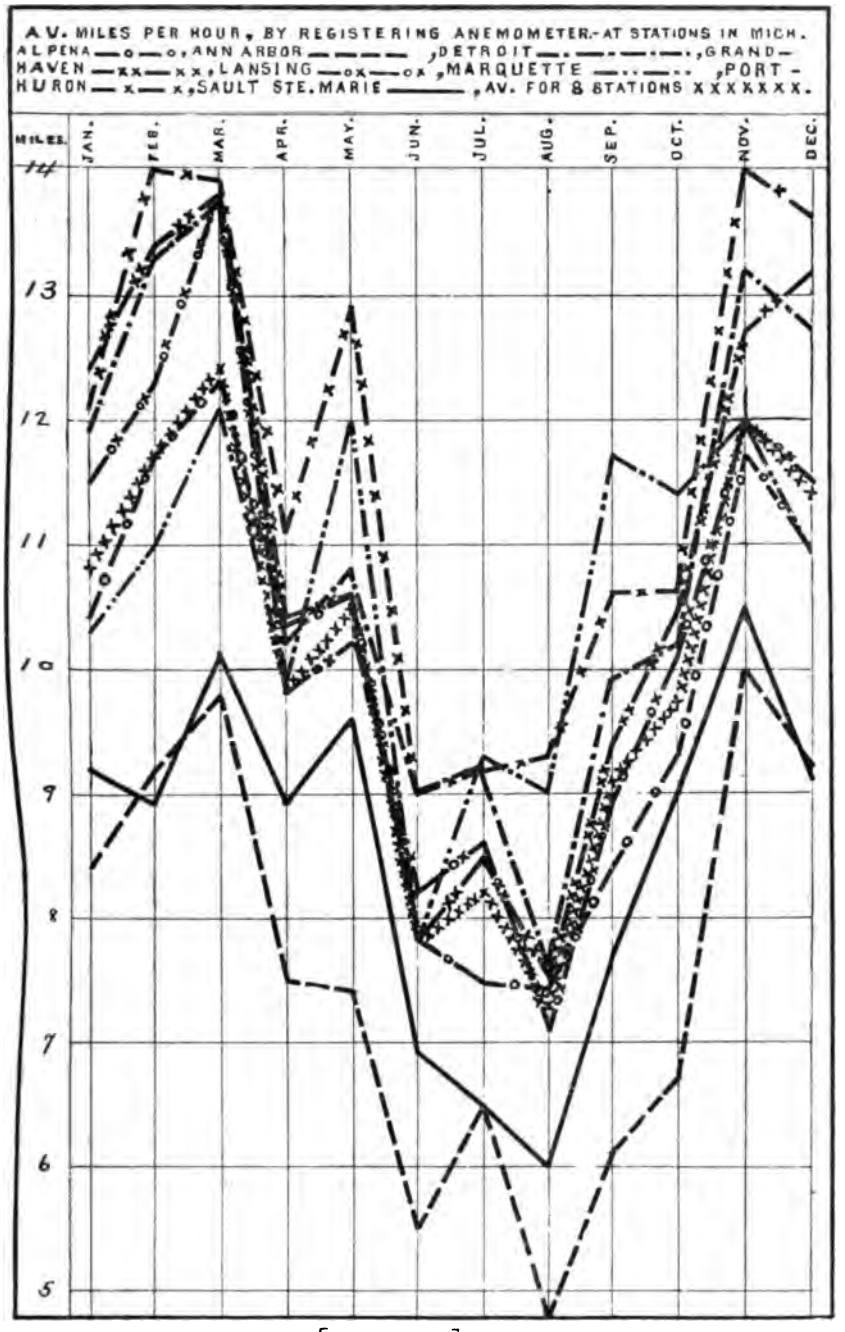
‡ Numbers in this column state the average velocity of the wind in miles per hour for periods ending in each case with Dec. 31, 1894. The small figures above and at the right of numbers whic the average, denote the number of years included in the average.

Graphic representations of statements made in Table XI., are giv Diagram XI., page 59.

The construction and purport of the diagrams relating to directi wind may be explained as follows:—

In Diagrams XII., XIII., XIV. and XV., pages 64, 60, 61 and 62, relating to the direction of the w single figures or separate groups in lines are designed to indicate by the length of the lines the num the proportion of regular observations at 7 A. M., 2 P. M. and 9 P. M. daily, at which the wind wa ing from each of the eight principal points of compass at the places and for the periods of time s the margin; and by the direction of the lines on the page, the direction of the wind. Each figu sists of lines drawn to a common center from some or all of the following directions on the p indicating that at the times of observation the wind blew from points of the compass as follows toward the common center from the top of the page indicate observations that the wind was from the north; from the right-hand side, observations that the wind was from the east; from the of the page, that it was from the south; from the left-hand side, that it was from the west; from th left-hand corner, that it was from the northwest; from the upper right-hand corner, that it was f northeast; from the lower right-hand corner, that it was from the southeast; and from the lower le corner that it was from the southwest. The number of regular observations at which the wind was from the direction denoted by a line as indicated by the length of that line, .01 of an inch being or the length of line for one observation. The circles indicate calms, the number of regular obser at which there was no wind being denoted by the length of the *radius* of the circle drawn about th of convergence of the lines for a given place or period of time, the length of one observation b before, .01 of an inch. Thus, by Diagram XII., page 64, or by Table XIV., pages 65-68, it appears that Arbor in February, 1894, at seven of the regular tri-daily observations for the month there was a c 12 observations the wind was blowing from the west; at 11 observations, from the northwest; at the northeast, etc. For convenient study the top of these diagrams should be held toward the Definite numerical statements corresponding to these diagrams are given in Tables XII., XIII., a and Exhibit 34, pages 61, 62, 65-68, 60.

DIAGRAM XI.— VELOCITY OF WIND, BY MONTHS IN 1894.



[PLATE 810]

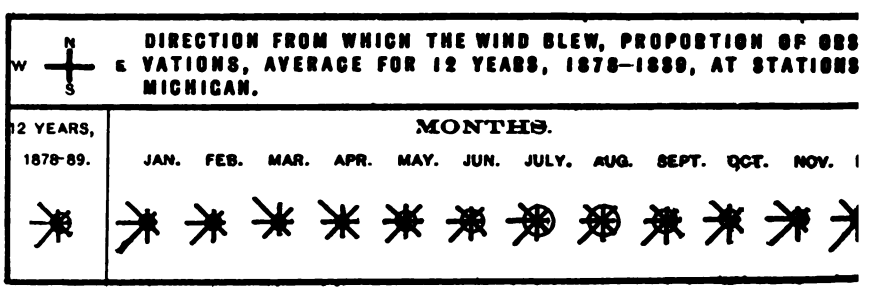
EXHIBIT 34.—DIRECTION OF WIND, 1878-89.—*Number of Observations per m (made tri-daily), at which the wind was blowing from the several (eight) poin Compass.—Annual and Monthly Averages for the 12 years, 1878-89, at Statio Michigan.**

Points of Compass.	Average Number of Observations per Month—12 Years, 1878-89.											
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
All obseervations ...	91	93	85	93	90	93	90	93	93	89	92	90
Calm	5	4	4	4	4	5	6	8	8	6	5	4
North	7	6	6	10	9	8	7	8	8	6	8	6
Northeast	8	6	7	10	11	11	9	8	10	7	8	7
East	6	5	6	7	8	8	6	5	6	6	5	5
Southeast	9	9	9	9	11	11	10	8	9	11	9	7
South	10	11	10	7	8	10	11	10	10	12	12	11
Southwest	17	22	16	12	12	15	16	18	17	18	18	19
West	14	16	14	14	11	12	13	16	12	12	13	17
Northwest	14	15	13	19	16	13	11	13	13	12	14	15

*At 13 stations in 1878; 16 in 1879; 19 in 1880; 19 in 1881; 21 in 1882; 19 in 1883; 21 in 1884; 21 in 1885; 1886; 17 in 1887; 13 in 1888; and 11 in 1889.

Graphic representations of statements made in Exhibit 34 are give Diagram XIII., this page.

DIAGRAM XIII.—WIND, DIRECTION, IN MICH., AVERAGE 12 YEARS, 1878–1



*SCALE, RADIUS .01 OF ONE INCH TO ONE OBSERVATION

[Plate 675.]

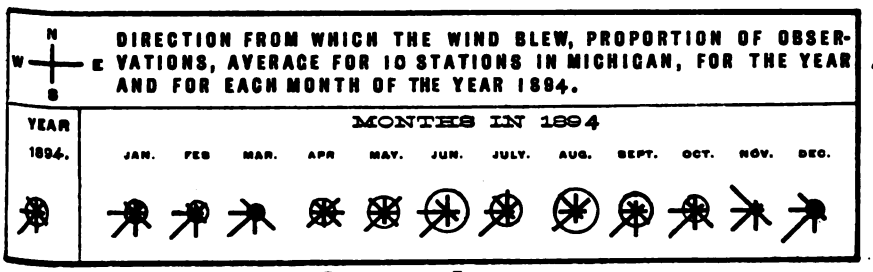
TABLE XII.—*Number of Obervations per Month (at 7 A. M., 2 P. M. and 9 P. M., daily), at which the wind was blowing from each of the Eight Principal Points of Compass, during the Year and during each month of the Year 1894. Average for 10 Stations in Michigan.**

Points of Compass.	Average Number of Observations per Month, 1894.												
	Year.	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.
All observations (10 stations).....	89	91	83	91	86	90	89	91	87	88	92	89	90
Calm.....	8	6	6	5	7	9	12	9	12	9	7	3	5
North.....	7	5	5	5	9	8	9	12	10	6	6	5	4
Northeast.....	7	6	7	4	11	13	1	8	10	5	4	4	5
East.....	6	6	4	4	12	8	6	5	6	6	6	4	5
Southeast.....	10	11	6	14	12	11	7	6	5	10	14	12	8
South.....	11	13	12	13	8	7	8	7	7	14	13	11	13
Southwest.....	19	20	21	20	12	15	21	21	16	21	21	19	25
West.....	12	15	13	15	7	8	16	12	8	10	15	13	14
Northwest.....	10	9	9	11	8	11	9	11	13	7	6	13	11

*The names of observers, their places of observation, and the counties and divisions of the State in which those places are situated, are stated in Exhibit 1, page 2.

Graphic representations of statements in Table XII. are given in Diagram XIV., this page.

DIAGRAM XIV.—WIND, DIRECTION, IN MICH., YEAR AND MONTHS, 1894.



[PLATE XII.]

TABLE XIII.—*Average Number of Observations per Month for the Year 1894, on which the wind was blowing from each of the Eight Principal Points of the Compass, at each of 10 Stations* in Michigan; also the average line for the 10 Stations.*

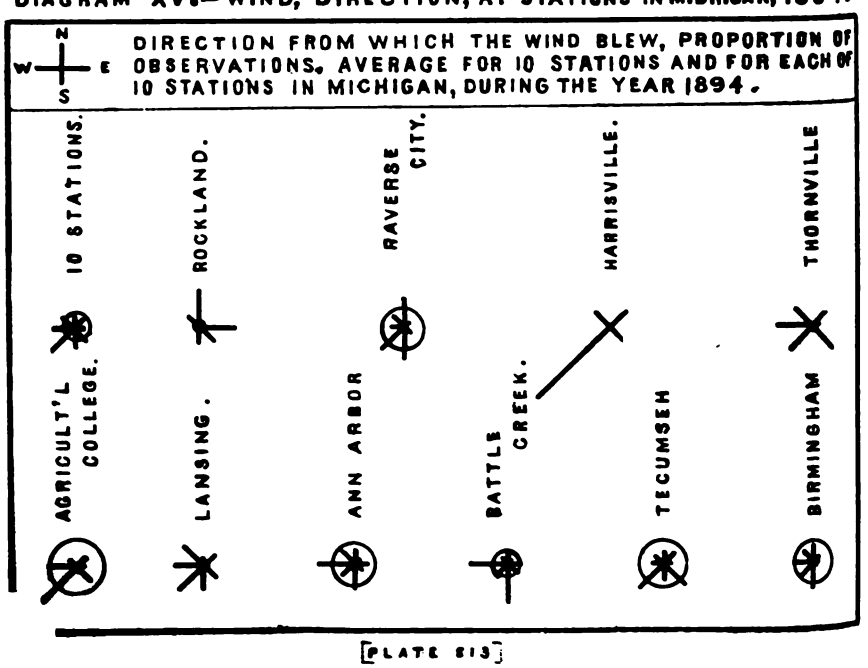
Stations in Michigan.*	Divisions of the State.†	Average Number of Observations per Month, 1894.									
		All Obs.	Calms.	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.
Av. for 10 stations		90	8	7	7	6	10	11	19	12	10
Rockland	U. P.	81	3	21	2	21	11	9	3	3	9
Traverse City	N. W.	91	12	16	4	3	5	13	13	8	8
Harrisville	N. E.	91	0	0	12	0	11	0	56	1	12
Thornville	B. & E.	91	0	0	13	4	17	2	19	21	15
Agricultural College	C.	91	15	0	8	5	11	3	23	16	7
Lansing, S. B. of H.	C.	91	0	5	9	3	11	14	20	16	13
Ann Arbor	S. C.	91	13	8	4	9	5	14	10	20	13
Battle Creek	S. C.	91	8	7	3	7	7	23	11	21	6
Tecumseh	S. C.	91	13	6	9	5	15	10	19	6	8
Birmingham	S. E.	83	12	10	4	4	4	14	11	13	9

* The names of observers, their places of observation, and the counties in which these places are situated, are stated in Exhibit 1, page 2.

† The full names of the divisions and counties in each division, are stated in Exhibit L., in a paper which follows, on weekly reports of sickness.

Graphic representations of statements in Table XIII., are given in Diagram XV., this page.

DIAGRAM XV.—WIND, DIRECTION, AT STATIONS IN MICHIGAN, 1894.



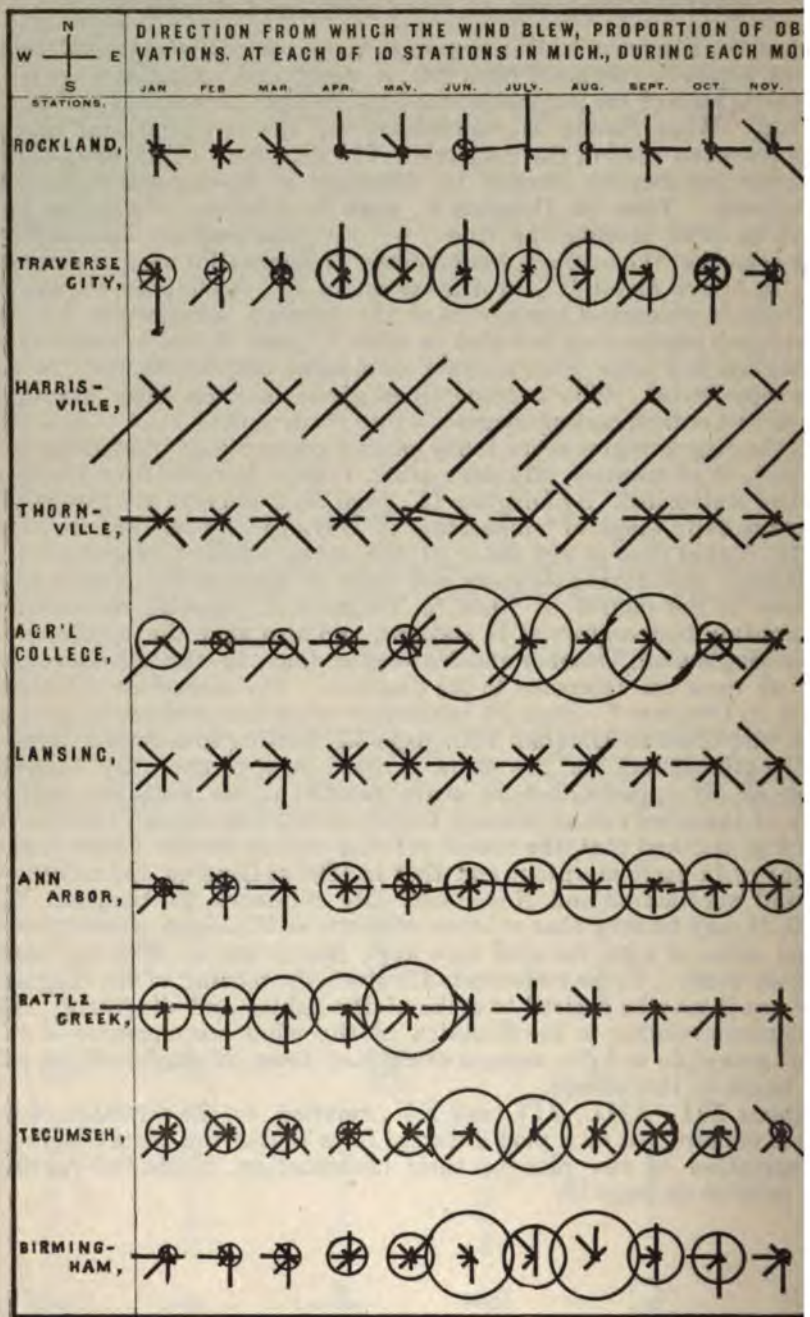
[PLATE 813]

DIAGRAMS RELATING TO METEOROLOGICAL CONDITIONS.

Most of the diagrams in this paper are to be read by tracing each irregular line across the diagram from left to right, and noting at what point it intersects each of the perpendicular lines having the name of the month at the top. What station is represented by the irregular line may be learned from the head of the diagram. The degree of value denoted by the intersection may be learned by referring to the figures in the left-hand column. Thus, in Diagram I., page 20, relating to average temperature in 1894, tracing the line "——×" representing Thornville, it may be seen that the average temperature at Thornville was, in January, 29.33°, in March about 41°, in August about 70°, in October about 52°, etc. Definite numerical statements of the average temperature for each month at each station may be found in table I., page 21, and accompanying each diagram is a table giving exact numerical statements for the conditions represented. The average lines given in each table are represented in the corresponding diagram by an × line, thus × × × ×. The lines in the diagrams give more ready general comparisons of stations with each other, or of months, with each other, than is possible from the mere numerical statements. By Diagram II., page 27, it appears at a glance that the average daily range of temperature at Traverse City in 1894 was, during July, higher than at any other of the seven stations represented in that diagram, and during January was lower at Thornville. The marked agreement in the course of lines in Diagram I., page 20, representing mean monthly temperature at 11 stations, and also that the agreement is closer in September, October and November than in the other months, appear at once on reference to the diagram. The resemblance between the lines in Diagram I., page 20, relating to mean temperature by months in 1894, and those in Diagram III., page 33, relating to absolute humidity of the atmosphere for the same periods, is apparent. By Diagram X., page 57, it appears that in every month of the year the highest velocity of the wind (on an average for the month) is reached between 12 m. and 3 p. m., and that the lowest velocity occurs in the latter part of the night or in early morning, and that in 1894 at Lansing, the months of most wind were March and November. By reference to Diagram XI., page 59, it may be seen that at other stations in Michigan where records of actual miles of wind traveled were kept, March was in 1894 the month of greatest wind. These statements illustrate the reading of the diagrams for any use it may be desired to make of the tables and diagrams. The four diagrams relating to the direction of the wind are constructed on a different principle and the manner of reading them is explained on preceding pages in this article.

Diagrams XII., XIII., XIV. and XV., relating to the direction of the wind, are constructed on a plan different from that of the other diagrams. A description of the plan of their construction, method of reading, etc., is printed on page 58.

DIAGRAM XII.—WIND, DIRECTION AT STATIONS, BY MONTHS,



[PLATE XII]

TABLE XIV.—*Number of Observations for Months and Year 1894, at which the wind was blowing from each of the Eight Principal Points of the Compass, at 12 Stations* in Michigan; also Average Line for 10 of the said Stations† from which nearly Complete Observations were received for the Year. (Observations were made at 7 A. M., 2 P. M. and 9 P. M., Daily.)*

Stations in Michigan.*	Divisions of the State.*	January.										February.										March.									
		Total.	Calm.	N.	N.E.	E.	S.E.	S.	S.W	W.	N.W	Total.	Calm.	N.	N.E.	E.	S.E.	S.	S.W	W.	N.W	Total.	Calm.	N.	N.E.	E.	S.E.	S.	S.W	W.	N.W
Av. 10 stations†		92	6	5	6	6	11	13	20	15	9	83	6	5	7	4	6	12	21	13	9	92	5	5	4	4	14	13	20	15	11
Rockland	U. P.	89	4	19	4	19	17	13	1	4	8	76	4	12	10	15	9	11	5	5	5	89	0	16	2	18	20	7	4	7	15
Traverse City	N. W.	93	10	6	3	0	7	32	13	11	11	84	7	11	5	2	0	20	25	9	5	93	6	12	2	2	11	16	25	6	13
Harrisville	N. E.	93	0	0	8	0	11	0	54	4	16	84	0	0	11	0	6	0	55	1	11	98	0	0	15	0	11	0	51	1	15
Ashton	N. C.	-----	-----	----	----	----	----	--	---	----	---	-----	-----	----	----	----	----	--	---	----	---	-----	-----	----	----	----	----	--	---	----	---
Thornville	B. & E.	93	0	1	10	8	21	5	17	22	9	84	0	0	13	4	16	6	16	20	9	93	0	0	5	1	26	3	24	15	16
Agr'l College	C.	93	14	0	14	4	15	0	32	11	3	84	6	0	5	0	9	0	39	17	8	98	8	0	2	0	18	1	31	28	5
Lansing, S. B. of H.	C.	93	0	2	9	1	13	15	21	15	17	84	0	4	12	3	7	15	21	7	15	93	0	4	4	3	7	25	15	18	17
Albion	S. C.	94	21	4	1	1	10	6	28	15	6	84	13	6	5	3	5	3	27	10	12	93	9	2	1	1	10	5	41	14	10
Ann Arbor	S. C.	93	5	4	2	10	9	13	21	19	10	84	7	8	5	5	3	18	15	12	11	93	2	5	2	7	12	24	11	21	9
Battle Creek	S. C.	93	14	2	1	2	2	24	7	37	4	84	14	6	2	3	2	23	3	31	0	98	18	3	0	2	7	25	8	28	2
Tecumseh	S. C.	93	11	10	8	6	10	15	19	9	5	84	11	5	5	4	5	11	18	8	17	93	11	5	7	4	17	14	17	9	9
Birmingham	S. E.	88	5	6	2	9	7	15	18	20	6	77	6	7	3	6	4	18	8	17	8	85	7	6	0	7	7	18	15	15	10

* For names of observers, etc., see Exhibit 1, page 2. For names of divisions, etc., see Exhibit I., in a paper which follows on weekly reports of sickness.

† This line includes only the 10 stations, at which observations were made tri-daily, and from which statements complete, or nearly complete, were received for every month of the year; it does not include Ashton and Albion.

NOTE.—Graphic representations of statements for 10 lines in this table are given in Diagram XII., page 64, which is explained on page 58.

TABLE XIV.—CONTINUED.—*Direction of Wind, Months in 1894.—Observations at which the Wind was blowing from Direction named.*

Stations in Michigan.*	Divisions of the State.*	April.										May.										June.									
		Total.	Calm.	N.	N.E.	E.	S.E.	S.	S.W	W.	N.W	Total.	Calm.	N.	N.E.	E.	S.E.	S.	S.W	W.	N.W	Total.	Calm.	N.	N.E.	E.	S.E.	S.	S.W	W.	N.W
Av. 10 Stations†		88	7	9	11	12	12	8	12	7	8	90	9	8	13	8	11	7	15	8	11	89	12	9	1	6	7	8	21	16	9
Rockland	U. P.	74	3	22	2	32	6	7	0	0	2	73	3	22	2	17	5	8	0	1	15	88	5	21	0	36	5	11	4	1	5
Traverse City	N. W.	90	13	29	5	5	7	11	8	2	10	92	16	26	9	0	6	7	16	1	11	90	18	30	2	0	4	12	13	5	6
Harrisville	N. E.	90	0	0	24	0	26	0	31	1	8	93	0	0	31	1	15	0	35	0	11	90	0	0	1	0	9	0	66	0	14
Ashton	N. C.	87	1	10	1	13	14	0	18	14	16	93	0	6	18	3	14	5	20	13	14	86	6	16	3	0	2	1	34	18	6
Thornville	B. & E.	90	0	0	23	11	20	1	9	8	18	93	0	0	19	10	22	0	12	16	14	90	0	1	1	4	15	0	15	36	18
Agr'l College	C.	90	7	0	13	13	10	0	19	21	7	93	9	0	23	11	12	3	22	8	5	90	31	0	1	2	7	0	19	20	10
Lansing, S. B. of H.	C.	90	0	10	17	5	16	10	11	7	14	93	0	8	14	7	11	9	13	13	18	90	0	4	1	3	7	9	34	23	9
Albion	S. C.	90	10	5	9	10	16	3	18	8	11	93	12	10	5	8	7	6	15	15	15	90	21	3	2	0	4	3	32	12	13
Ann Arbor	S. C.	90	13	8	9	15	7	9	8	10	11	93	7	16	2	13	6	16	9	15	9	90	14	10	0	6	7	14	9	27	3
Battle Creek	S. C.	90	18	2	2	11	16	22	5	11	3	93	26	1	1	4	7	12	18	18	6	90	0	8	3	2	0	13	25	27	12
Tecumseh	S. C.	90	6	7	10	13	24	8	15	4	3	93	13	6	11	8	18	4	20	4	9	90	23	5	3	2	15	7	21	10	4
Birmingham	S. E.	81	11	14	8	10	4	9	10	10	5	87	13	4	17	8	5	7	9	14	10	80	24	7	1	1	4	15	8	9	11

*† For these references see foot-notes to this table on page 65.

NOTE.—Graphic representations of statements for 10 lines in this table are given in Diagram XII., page 64, which is explained on page 58.

Stations in Michigan.*	Divisions of the State.*	July.											August.										September.											
		Total.	Calm	N.	N.E.	E.	S.E.	S.	S.W	.	N.W		Total.	Calm.	N.	N.E.	E.	S.E.	S.	S.W	W.	N.W		Total.	Calm.	N.	N.E.	E.	S.E.	S.	S.W	W.	N.W	
Av. 10 Stations†		91	9	12	8	5	6	7	21	12	11		89	12	10	10	6	5	7	16	8	13		88	9	6	5	6	10	14	21	10	7	
Rockland	U. P.	85	2	40	1	23	5	12	0	0	2		63	3	24	0	25	2	9	0	0	0		83	2	21	0	23	10	18	2	1	6	
Traverse City	N. W.	93	14	22	5	1	2	10	29	4	6		93	17	23	3	1	0	19	11	9	10		90	15	6	1	0	3	22	25	12	6	
Harrisville	N. E.	93	0	0	9	0	8	0	62	1	13		93	0	0	10	0	9	0	57	2	15		90	0	0	6	0	15	0	68	0	1	
Ashton	N. C.	81	0	12	1	2	3	3	16	27	17		85	0	16	2	8	6	1	9	22	21		82	0	0	0	3	8	5	32	22	12	
Thornville	S. & E.	93	0	0	21	2	13	1	17	22	17		93	0	2	20	3	5	1	26	6	30		90	0	1	12	0	20	0	29	15	13	
Agr'l College	C.	91	24	1	1	10	5	0	34	9	7		93	33	0	18	6	1	0	18	9	8		90	26	0	2	1	14	0	27	11	9	
Lansing, S. B. of H.	C.	93	0	5	13	4	8	4	25	19	15		93	0	4	20	1	9	7	21	17	14		90	0	6	6	2	10	24	18	19	5	
Albion	S. C.																																	
Ann Arbor	S. C.	93	15	11	3	7	3	5	5	31	13		93	20	11	7	11	1	11	1	17	14		90	19	5	6	11	5	16	6	18	4	
Battle Creek	S. C.	93	0	16	5	5	3	19	9	24	12		93	0	12	3	9	6	20	6	21	16		90	2	5	2	10	9	33	9	16	4	
Tecumseh	S. C.	93	21	10	16	1	14	4	22	2	3		93	18	9	15	7	15	12	11	1	5		90	12	2	13	8	13	12	17	3	10	
Birmingham	S. E.	* 80	17	16	1	1	1	11	10	6	17		81	24	17	8	0	3	2	9	2	16		78	14	18	4	3	2	13	8	9	7	

*† For these references see foot-notes to this table on page 65.

NOTE.—Graphic representations of statements for 10 lines in this table are given in Diagram XII., page 64, which is explained on page 58.

TABLE XIV.—CONCLUDED.—*Direction of Wind, Months in 1894.—Observations at which the Wind was blowing.*

Stations in Michigan.*	Divisions of the State.*	October.										November.										December.									
		Total.	Calm.	N.	N.E.	E.	S.E.	S.	S.W	W.	N.W	Total.	Calm.	N.	N.E.	E.	S.E.	S.	S.W	W.	N.W	Total.	Calm.	N.	N.E.	E.	S.E.	S.	S.W	W.	N.W
Av. 10 stations†		92	7	6	4	6	14	13	21	15	6	88	3	5	4	4	12	11	19	13	18	91	5	4	5	5	8	13	25	14	11
Rockland	U. P.	87	3	27	2	22	15	7	1	3	7	85	2	12	2	11	27	1	4	3	23	80	2	11	2	16	12	8	5	0	24
Traverse City	N.W.	93	10	10	6	0	9	29	15	8	6	90	5	8	3	2	8	18	13	17	16	93	16	3	1	5	3	22	25	7	11
Harrisville	N. E.	93	0	0	7	0	11	0	71	0	4	90	0	0	11	0	4	0	54	1	20	93	0	0	8	0	7	0	62	3	13
Ashton	N. C.	88	0	7	3	3	16	6	27	15	11	87	0	13	3	3	8	5	18	19	18	92	0	4	2	5	3	17	26	17	18
Thornville	B. & E.	93	0	0	7	0	24	0	19	32	11	90	1	0	4	3	17	2	20	19	24	93	0	0	7	3	9	7	20	43	4
Agr'l College	C.	93	10	0	5	8	23	2	32	8	5	89	1	0	8	1	6	5	34	25	9	93	6	0	3	7	12	7	34	21	3
Lansing, S. B. of H.	C.	93	0	1	4	0	22	19	13	24	10	90	0	3	4	0	17	10	16	9	31	93	0	3	7	2	4	15	29	16	17
Albion	S. C.	93	27	0	5	1	14	3	38	2	3	90	22	1	2	2	8	3	25	10	17	93	24	5	2	2	2	8	28	14	8
Ann Arbor	S. C.	93	17	2	2	8	6	14	8	28	8	90	14	6	1	6	3	13	10	22	15	93	9	5	4	5	2	17	19	23	9
Battle Creek	S. C.	92	0	6	2	14	6	22	20	21	1	90	0	11	4	6	9	32	9	13	6	93	0	7	4	10	18	20	18	8	8
Tecumseh	S. C.	93	12	4	4	8	15	13	26	9	2	90	6	8	3	3	19	10	16	3	22	93	8	5	11	0	13	9	28	7	12
Birmingham	S. E.	87	14	13	3	2	4	23	9	18	1	79	4	5	0	4	6	19	15	16	10	82	9	10	1	1	3	22	13	13	10

*† For these references see foot-notes to this table on page 65.

NOTE.—Diagram XII., page 64, exhibits lines showing, by months, directions of wind at each of 10 stations in this table; for each month and station, the diagram represents the figures given in this table for the same month and stations; it is explained on page 58.

LE XV.—*Average Daily Range of Atmospheric Pressure (as determined from e daily observations) for Months and Year 1894, at 12 Stations, also average for 10 stations* in Michigan—Stations arranged in order by Latitude, those thest North first.*

Stations i Michigan.*	Average Daily Range of Barometer—Year and Months, 1894.														
	Norm. †	1893.	1894.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
or 10 Stations‡...			.203	.293	.290	.221	.217	.172	.124	.109	.114	.155	.228	.267	.244
land			.240	d .330	f .293	b .259	h .265	i .222	d .129	h .139	j .175	h .182	e .237	f .304	g .347
rse City	.216[13]	.223	.214	.289	.279	.255	.227	.168	.129	.112	.132	.176	.242	.293	.267
isville.....			¶		.298	.259	.243	.175	.149	.119	.144	.173	.236	.297	.268
on			§				.205	.136	.124	.107	.110	.148	.179	.252	.218
aville	.215[11]	.240	.205	.302	.290	.214	.208	.159	.136	.116	.117	.178	.238	.272	.224
ultural College ..	.200[12]	.208	.174	.242	.258	.194	.198	.142	.098	.085	.095	.125	.202	.244	.215
ing, S. B. of H. ..	.206[13]	.230	.198	.285	.275	.222	.213	.154	.120	.106	.111	.156	.225	.279	.226
ingham	.209[3]	.233	.199	a .294	d .291	c .224	c .212	.147	f .126	c .113	b .112	b .152	.229	d .263	.225
e Creek.....	.215[3]	.226	.223	.357	.369	.192	.230	.273	.170	.110	.109	.146	.218	.261	.240
Arbor	.205[13]	.229	.193	.277	.285	.224	.203	.151	.114	.100	.098	.151	.238	.254	.223
nsah.....	.198[3]	.216	.186	.278	.276	.207	.203	.144	.107	.098	.089	.133	.217	.250	.226
n			.196	.277	.279	.216	.216	.161	.114	.106	.102	.153	g .233	.252	f .243

e names of observers, their places of observation, and the counties in which these places are situ-re stated in Exhibit 1, page 2. The average atmospheric pressure at each of these stations, by s, in 1894, is given in Table XVII., page 72.
mbers in this column state the average daily range of atmospheric pressure for periods of years in each case with Dec. 31, 1894. The small figures above and at the right of numbers which state erage daily range, denote the number of years included in the average.
t including Ashton and Harrisville.
e average for 11 months is .214. § For 9 months, .164.
r 30 days. b For 29 days. c For 28 days. d For 27 days. e For 25 days. f For 24 days. g For 22 h For 21 days. i For 20 days. j For 17 days.
s.—The latitude and elevations of some of the stations in Table XV. are stated in Exhibit 2, page 3.

ie daily range is found by subtracting the lowest observation from the est observation, 7 A. M. to 7 A. M.

TABLE XVI.—*Range of Atmospheric Pressure (as determined from 3 Daily Observations) for the Year and for each Month and for the Average Month of the Year 1894, at 9 and at each of the 9 Stations, and Average Line for 9 Stations in Michigan; also the Norm.—Average Monthly range for a series of years. Stations named in order by Latitude, those farthest North first.*

Stations in Michigan.	Range of Barometer.—Year and Months, 1894.															
	Norm.†	1893.	1894.	Av. Month	Jan.	Feb.	Mar.	Apr.	May.	Jun.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
For 9 stations‡			1.801	1.249	1.406	1.801	1.082	1.338	1.233	1.215	.788	.880	1.118	1.173	1.560	1.394
Av. for 9 stations¶			1.454	.840	1.050	1.447	.799	.866	.873	.644	.411	.465	.680	.752	1.150	.947
Rockland				§	d 1.048	f 1.454	b 1.050	g 1.154	i 1.036	d .630	e .528		g .731	e .977	f 1.099	h 1.298
Traverse City	.967[13]	1.623	1.560	.943	1.145	1.560	.872	1.031	.995	.602	.430	.520	.802	.842	1.353	1.161
Harrisville				‖		1.576	.823	.984	1.011	.660	.498	.536	.738	.796	1.239	1.061
Ashton				**				.809	.804	.531	.384	.425	.647	.747	1.063	.986
Thornville	.946[11]	1.757	1.496	.853	1.018	1.496	.755	.903	.911	.671	.418	.484	.749	.764	1.119	.951
Agr'l College	.906[12]	1.642	1.400	.779	.978	1.400	.751	.840	.835	.519	.319	.422	.608	.700	1.045	.936
Lansing, S. B. of H.	.914[13]	1.688	1.525	.853	1.055	1.525	.769	.912	.863	.620	.409	.469	.714	.749	1.200	.951
Birmingham	.927[5]	1.783	1.508	.840	a 1.069	d 1.508	c .773	b .869	.851	f .622	c .453	b .456	b .723	.744	d 1.122	.894
Battle Creek	.896[4]	1.645	1.150	.823	1.063	1.086	.997	.661	.773	.996	.436	.471	.601	.717	1.122	.950
Ann Arbor	.909[13]	1.650	1.479	.831	1.045	1.479	.764	.859	.918	.612	.414	.454	.577	.782	1.149	.918
Albion				††	1.586	1.392	1.070	.826	.813	.578				.970	1.133	.869
Tecumseh	.894[3]	1.648	1.462	.811	1.06.	1.462	.717	.870	.842	.552	.404	.447	.680	.732	1.105	.879
Adrian			1.503	.820	1.019	1.503	.797	.845	.865	.599	.418	.461	.691	h .741	1.134	e .887

† Numbers in this column state the average monthly range of atmospheric pressure for a period of years ending in each case with December 31, 1894. The small figures above and at the right of numbers which state the average, denote the number of years included in the average.

‡ Represents the difference between the highest of 9 stations and the lowest of 9 stations for year and for each month of year, not including Ashton, Albion, Rockland, and Harrisville.

¶ Represents sum of ranges at 9 stations divided by 9.

§ The average for 11 months is 1.000. ‖ For 11 months, .902. ** For 9 months, .708. †† For 9 months, 1.034.

a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly above the numbers from which they refer to the notes below.

a For 30 days. b For 29 days. c For 28 days. d For 27 days. e For 25 days. f For 24 days. g For 23 days. h For 22 days. i For 20 days.

NOTE.—The statements in the star (*) foot-note to Table XV. apply also to Table XVI.

XHIBIT 35.—*Average Atmospheric Pressure, by Year and Months, in 1894, Compared with Annual and Monthly Averages for 1893, and for the 17 years, 1877–93. These Averages are for Groups of Several Stations in Michigan.**

Years, etc.	Average Atmospheric Pressure.—Inches of Mercury.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
v. 17 years, 1877-93.	29.142	29.168	29.170	29.138	29.123	29.099	29.095	29.117	29.142	29.132	29.165	29.152	29.151
93 (8 stations).....	29.060	28.977	29.124	29.067	29.000	28.982	29.066	29.077	29.111	29.086	29.079	29.059	29.093
94 (10 stations)...	29.053	29.076	29.087	29.042	29.064	28.995	29.035	29.063	29.082	29.089	28.961	29.060	29.082
n 1894 Greater than Av. for 17 years, 1877-93.....													
n 1894 Less than Av. for 17 years, 1877-93.....	.089	.087	.083	.096	.059	.104	.060	.054	.060	.093	.204	.092	.069
n 1894 Greater than in 1893.....		.099			.064	.013				.003		.001	
n 1894 Less than in 1893.....	.007		.037	.025			.031	.014	.029		.118		.011

* Woodmere Cemetery (near Detroit) for 1877-79; Mendon for 1877-78, 1881-83; Benton Harbor for 1877-78; eilanti for 1877, 1879; Otisville for 1878-80, 1882; Washington for 1879-80, 1882-83; Nirvana for 1879 and in 0 to April 25 inclusive; Reed City for 1880 after April 25 and 1881-85; Hastings for 1882; Hillsdale for 2-83; Manistique for 1884-85; Mackinaw City for 1884-87; Ionia for 1884-85; Swartz Creek for 1885; Port tin for 1883-84, 1888-89; Marquette for 1879-84, 1886-87; Escanaba for 1880, 1882-87; Alpena, Grand Haven, rt Huron for 1879-87; Detroit for 1878-87; Kalamazoo for 1877-82, 1885-89; Alma for 1890; Gulliver Lake r 1888-90, 1892; Marshall for 1883-92; Albion for 1890-91; Rockland for 1891-92; Harrisville for 1882, 1885-92; cumseh for 1879-80, 1882-85, 1890, 1892-93; Birmingham for 1887-93; Battle Creek for 1877-80, 1882, 1888-89, 91-93; Lansing for 1879-93; Agricultural College for 1877, 1881-93; Thornville for 1880-1, 1884-93; Ann Arbor r 1881-93; Traverse City for 1882-93.

XHIBIT 36.—*Comparisons of the Average Atmospheric Pressure during the Year and during each Month of the Year 1894, with Averages for the 19 Years, 1875–93, and for the Year 1893. Corrected for Temperature and for Instrumental Error. Observations made at 7 A. M., 2 P. M. and 9 P. M., Daily, by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Michigan.*

Years, etc.	Average Atmospheric Pressure.—Inches of Mercury.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
v. 19 years, 1875-93.	29.068	29.077	29.076	29.039	29.043	29.032	29.041	29.068	29.056	29.115	29.081	29.078	29.078
893.....	29.019	28.995	29.102	29.050	28.965	28.971	29.079	29.056	29.106	28.980	28.967	28.985	28.971
894.....	29.088	28.989	29.016	29.008	29.055	28.987	29.039	29.064	29.085	29.103	28.982	29.056	29.075
n 1894 Greater than Av. for 19 years, 1875-93.....					.012								
n 1894 Less than Av. for 19 years, 1875-93.....	.030	.082	.060	.031		.045	.002	.004	.001	.012	.099	.022	.003
n 1894 Greater than in 1893.....	.019				.090	.016		.008	.021	.123	.015	.071	.104
n 1894 Less than in 1893.....		.006	.086	.042			.040						

TABLE XVII.—*Average Atmospheric Pressure for Months and Year 1894, at 13 Stations in Michigan; also Average line for 10 Stations, as indicated by the height, in inches, of Mercury in the Barometer. Corrected for Temperature.—Reduced to 32° F. (for some stations not corrected for instrumental errors*).—Average of Observations made Daily at 7 A. M., 2 P. M. and 9 P. M., by observers† for the State Board of Health.*

Stations in Michigan.†	Divisions of the State.‡	Inches of Mercury.—Atmospheric Pressure.													
		Years.		Months, 1894.											
		Norm.‖	1894.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 10 Stations¶			29.053	29.076	29.087	29.042	29.064	28.995	29.035	29.063	29.082	29.089	28.961	29.060	29.081
Rockland	U. P.		28.635	d28.647	f28.640	b28.589	g28.640	i28.163	d28.651	e28.671	j28.694	g28.646	e28.492	f28.646	g28.659
Traverse City	N. W.	29.326[12]	29.304	29.315	29.321	29.253	29.319	29.267	29.291	29.334	29.358	29.339	29.205	29.304	29.341
Harrisville	N. E.		**		29.370	29.295	29.361	29.281	29.302	29.344	29.393	29.369	29.248	29.336	29.308
Ashton	N. C.		††				28.673	28.609	28.661	28.686	28.719	28.711	28.551	28.619	28.656
Thornville	B. & E.	28.951[15]	28.988	28.962	28.983	28.917	28.945	28.861	28.926	28.956	28.973	28.992	28.856	28.936	28.951
Agricultural College	C.	29.080[13]	29.038	28.989	29.016	29.008	29.055	28.987	29.039	29.064	29.085	29.103	28.982	29.056	29.075
Lansing, S. B. of H.	C.	29.058[16]	29.077	29.091	29.107	29.050	29.077	29.003	29.068	29.101	29.118	29.123	28.995	29.085	29.105
Adrian	S. C.		29.134	29.190	29.197	29.139	29.142	29.051	29.115	29.131	29.145	29.168	h29.027	29.145	e29.163
Albion	S. C.		‡‡	28.766	28.775	28.737	28.761	28.683	28.752				28.757	28.777	28.826
Ann Arbor	S. C.	29.031[14]	29.035	29.066	29.077	29.036	29.043	28.955	28.980	29.049	29.069	29.080	28.963	29.043	29.062
Battle Creek	S. C.	29.070[4]	29.110	29.160	29.167	29.134	29.169	29.114	29.059	29.064	29.079	29.111	29.008	29.125	29.128
Tecumseh	S. C.	29.125[3]	29.151	29.190	29.203	29.192	29.135	29.048	29.130	29.146	29.171	29.181	29.053	29.164	29.196
Birmingham	S. E.	29.115[8]	29.107	a29.154	d29.155	c29.099	b29.111	29.026	f29.092	c29.109	b29.129	h29.150	29.026	c29.099	29.136

* A correction has been made for instrumental error of barometer at Agricultural College; .013 has been subtracted from each monthly average during the year 1894. For other stations the instrumental error of barometer is not known.

† The names of observers, their places of observation, and the counties in which these places are situated, are stated in Exhibit 1, page 2.

‡ The full names of divisions and the counties in each division are stated in Exhibit 1., in a paper which follows, on weekly reports of sickness.

‖ Numbers in this column state the average annual atmospheric pressure for periods of years ending in each case with December 31, 1894. The small figures at the right of the numbers which state the average, denote the number of years included in the average.

¶ This line is an average for 10 stations, at which observations were made tri-daily, and from which reports, nearly complete, were received for every month in the year. It does not include Ashton, Albion, and Harrisville. Green's standard barometer was used at all the 13 stations for 1894.

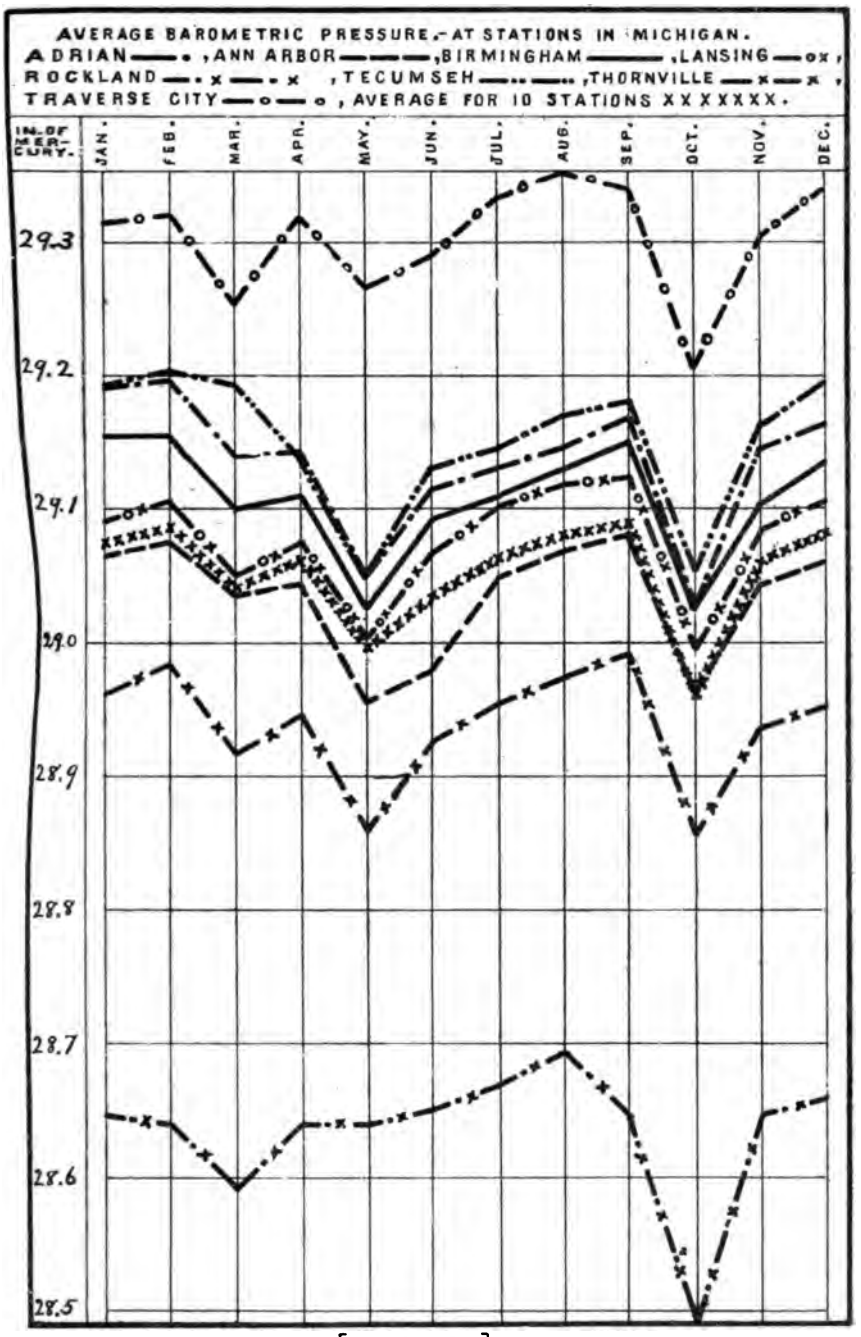
** The average for 11 months is 29.328. †† For 9 months, 28.654. ‡‡ For 9 months, 28.759.

NOTE.—Computations of monthly averages for the year 1894 were furnished by the observers at Albion and Ann Arbor. The remainder of the computations were made at the office of the State Board of Health.

a For 30 days. b For 29 days. c For 28 days. d For 27 days. e For 25 days. f For 24 days. g For 23 days. h For 22 days. i For 20 days. j For 18 days.

The lines for 8 stations in this table are graphically represented in Diagram XVI., page 73

DIAGRAM XVI.- ATMOSPHERIC PRESSURE, BY MONTHS, IN 1894.



[PLATE 814]

EXHIBIT 37.—*Average Daily Range of Atmospheric Pressure, by Year and Month in 1894, compared with Annual and Monthly Averages for 1893, and for the Years, 1882–93. These Averages are for Groups of Several Stations in Michigan.**

Years, etc.	Average Daily Range of Barometer.—Year and Months, 1894.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 12 years, 1882-93.	.212	.305	.311	.260	.223	.166	.137	.126	.132	.164	.208	.250	.2273
1893 (8 stations)	.227	.253	.366	.290	.288	.175	.138	.151	.123	.167	.225	.218	.229
1894 (10 stations)	.203	.293	.290	.221	.217	.172	.124	.109	.114	.155	.230	.267	.244
In 1894 Greater than Av. for 12 years, 1882-93						.006					.022	.017	
In 1894 Less than Av. for 12 years, 1882-93	.009	.012	.021	.039	.006		.013	.017	.018	.009			.029
In 1894 Greater than in 1893		.040									.005	.054	
In 1894 Less than in 1893	.024		.076	.069	.071	.003	.014	.042	.009	.012			.088

* Port Austin for 1883-84, 1888-89; Kalamazoo for 1886-89; Mackinaw City for 1884-87; Reed City for 1882-85; Washington, Mendon for 1883; Manistique, Ionia for 1884-85; Swartz Creek for 1885; Marquette for 1882-84, 1886-87; Escanaba, Grand Haven for 1882-87; Alpena, Port Huron, Detroit for 1883-87; Alma for 1890; Gulliver Lake for 1888-90, 1892; Marshall for 1883-92; Battle Creek for 1888-89, 1892-93; Harrisville for 1885-92; Albion for 1890-91; Traverse City, Lansing, Ann Arbor for 1882-93; Agricultural College for 1883-93; Rockland for 1891-92; Thornville for 1884-93; Birmingham for 1887-93; Tecumseh for 1882-85, 1890, 1892-93.

EXHIBIT 38.—*Range of Atmospheric Pressure, by Year and Months, in 1894, compared with Annual and Monthly Averages for 1893, and for the 12 Years, 1882-93. These Averages are for Groups of Several Stations in Michigan.**

Years, etc.	Range of Barometer.—Year and Months, 1894.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 12 years, 1882-93.	.978	1.291	1.336	1.172	1.075	.809	.723	.600	.618	.812	1.037	1.126	1.167
1893 (8 stations)	.969	1.110	1.482	1.066	1.138	.955	.591	.487	.489	.616	1.256	1.135	1.313
1894 (9 stations)	.840	1.050	1.447	.799	.866	.873	.644	.411	.465	.680	.752	1.150	.947
In 1894 Greater than Av. for 12 years, 1882-93			.111			.064						.024	
In 1894 Less than Av. for 12 years, 1882-93	.138	.241		.373	.209		.079	.189	.153	.132	.285		.220
In 1894 Greater than in 1893							.053			.064		.015	
In 1894 Less than in 1893	.129	.060	.035	.267	.272	.082		.076	.024		.504		.366

* Reed City for 1882-85; Port Austin for 1883-84, 1888-89; Washington, Mendon for 1883; Manistique, Ionia for 1884-85; Mackinaw City for 1884-87; Swartz Creek for 1885; Marquette for 1882-84, 1886-87; Escanaba, Grand Haven for 1882-87; Alpena, Port Huron, Detroit for 1883-87; Kalamazoo for 1888-89; Gulliver Lake for 1888-90, 1892; Marshall for 1883-92; Albion for 1890-91; Rockland for 1892; Harrisville for 1885-92; Tecumseh for 1882-85, 1892-93; Battle Creek for 1888-89, 1891-93; Traverse City, Lansing, Ann Arbor for 1882-93; Agricultural College for 1883-93; Thornville for 1884-93; Birmingham for 1887-93.

SUNSHINE AND CLOUDS.

On the back of each blank register supplied by this Board to observers, which they are to register meteorological data, is a statement that "One erver has reported a record of days 'all or nearly all cloudy' and days or nearly all sunshine.' The State Board of Health would be glad to e such a report from all observers who can conveniently make it. Memnda may be made in a column headed 'cloudy or sunny,' days more n 80 per cent of clouds being marked with the abbreviation 'C,' indi-ng *cloudy*, and days with less than 20 per cent of clouds with an 'S,' icating *sunshine*."

The following are statements of the days in each month which were orted "Sunny," "Clear," "Fair," "Partly cloudy," and "Cloudy," by ervers at stations in Michigan, except Thornville and Kalamazoo, con-ning which notes are given explaining the method of statement.

ROCKLAND.

NUARY.—Sunny, 7, 8, 9, 12, 13, 14, 18, 19, 25, 26, 27, 31—12 days. Cloudy, 1, 2, 3, 4, 5, 6, 10, 11, 15, 16, 17, , 22, 23, 24, 28, 29, 30—19 days.

BRUARY.—1, 2, 4, 5, 6, 13, 14, 20, 23, 24, 25, 26, 28—13 days. Cloudy, 3, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 22, 3 days.

RCH.—Sunny, 1, 2, 3 ,6, 8, 9, 12, 13, 17, 27, 28, 29, 30—13 days. Cloudy, 4, 5, 7, 10, 11, 14, 15, 16, 18, 19, 20, , 22, 24, 25, 26, 31—18 days.

RIL.—Sunny, 1, 2, 5, 6, 7, 8, 14, 16, 19, 21, 22, 23, 24, 25, 26, 27, 28, 29—18 days. Cloudy, 3, 4, 15, 17, 18, 20, days.*

Y.—Sunny, 2, 3, 4, 5, 7, 8, 11, 12, 18, 19, 20, 25, 27, 28, 29—15 days. Cloudy, 1, 6, 9, 10, 13, 14, 15, 16, 17, 21, —12 days.*

NE.—Sunny, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 18, 19, 20, 21, 22, 25, 26, 27, 29, 30—25 days. Cloudy, , 23, 24, 28—5 days.

LY.—Sunny, 1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 20, 21, 22, 23, 24, 25, 27, 28, 29, 31—27 days. ly, 3, 19, 26, 30—4 days.

GUST.—Sunny, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 15, 26, 27, 28, 30, 31—16 days. Cloudy, 1, 2, 6, 14, 29—5 days.*

PTEMBER.—Sunny, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 20, 21, 22, 25, 26, 27, 28, 29—25 days. ly, 7, 14, 23, 24, 30—5 days.

TOBER.—Sunny, 1, 6, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 24, 27, 28—18 days. Cloudy, 2, 3, 4, 5, 7, 23, 25, 26, 29, 30, 31—13 days.

VEMBER.—Sunny, 1, 8, 21, 23, 30—5 days. Cloudy, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, , 25, 26, 27, 28, 29—25 days,

CEMBER.—Sunny, 3, 4, 5, 14, 15, 19, 20, 25, 28—9 days. Cloudy, 1, 2, 6, 7, 8, 9, 10, 11, 12, 13, 16, 17, 18, 21. , 24, 26, 27, 29, 30, 31—22 days.

MARQUETTE.

UARY.—Clear, 7, 8, 11, 12, 14, 15, 18, 19, 27—9 days. Partly cloudy, 9. Cloudy, 1, 2, 3, 4, 5, 6, 10, 13, 16, , 21, 22, 23, 24, 25, 26, 28, 29, 30, 31—21 days.

BRUARY.—Clear, 1, 5, 6, 19, 20, 21, 23, 24, 25, 26, 28—11 days. Cloudy, 2, 3, 4, 7, 8, 9, 10, 11, 12, 13, 14, 15, , 18, 22, 27—17 days.

RCH.—Clear, 2, 14, 28—3 days. Cloudy, 1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, , 27, 29, 30, 31—28 days.

o record for the rest of the month.

APRIL.—Clear, 1, 2, 5, 6, 7, 8, 12, 14, 15, 16, 18, 19, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30—22 days. Cloudy, 3, 4, 10, 11, 13, 17, 21—8 days.

MAY.—Clear, 2, 3, 4, 7, 11, 12, 18, 19, 20, 24, 25, 28, 31—13 days. Cloudy, 1, 5, 6, 8, 9, 10, 13, 14, 15, 16, 17, 21, 23, 26, 27, 29, 30—18 days.

JUNE.—Cloudless days, 8. Partly cloudy, 12. Cloudy, 10.

JULY.—Cloudless days, 14. Partly cloudy, 10. Cloudy, 7.

AUGUST.—Cloudless days, 13. Partly cloudy, 10. Cloudy, 8.

SEPTEMBER.—Cloudless days, 12. Partly cloudy, 6. Cloudy, 12.

OCTOBER.—Cloudless days, 5. Partly cloudy, 6. Cloudy, 20.

NOVEMBER.—Cloudless days, 1. Partly cloudy, 3. Cloudy, 26.

DECEMBER.—Cloudless days, 5. Partly cloudy, 7. Cloudy, 19.

SAULT STE. MARIE.

JANUARY.—Clear, 30. Partly cloudy, 12, 13, 14—3 days. Cloudy, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30—27 days.

FEBRUARY.—Clear, 11, 20. Partly cloudy, 3, 4, 6, 7, 13, 14, 16, 21, 23, 24, 25, 26—12 days. Cloudy, 1, 2, 5, 8, 9, 10, 12, 15, 17, 18, 19, 22, 27, 28—14 days.

MARCH.—Clear, 27. Partly cloudy, 2, 3, 8, 14, 15, 16, 17, 18, 19, 23, 28, 29—12 days. Cloudy, 1, 4, 5, 6, 7, 9, 10, 11, 12, 13, 20, 21, 22, 24, 25, 26, 30, 31—18 days.

APRIL.—Clear, 8, 23, 24, 29—4 days. Partly cloudy, 1, 2, 12, 14, 25, 28, 30—7 days. Cloudy, 3, 4, 5, 6, 7, 9, 10, 11, 13, 15, 16, 17, 18, 19, 20, 21, 22, 26, 27—19 days.

MAY.—Clear, 12, 25. Partly cloudy, 2, 4, 9, 11, 13, 19, 24—7 days. Cloudy, 1, 3, 5, 6, 7, 8, 10, 14, 15, 16, 17, 18, 21, 21, 22, 23, 26, 27, 28, 29, 30, 31—22 days.

JUNE.—Clear, 2, 7, 9, 20, 30—5 days. Partly cloudy, 1, 3, 6, 8, 10, 11, 12, 13, 14, 15, 19, 21, 23, 28, 27, 29—16 days. Cloudy, 4, 5, 16, 17, 18, 24, 25, 26, 28—9 days.

JULY.—Clear, 8, 14, 15, 16, 17, 21, 23, 29—8 days. Partly cloudy, 1, 2, 6, 7, 9, 10, 18, 19, 22, 25, 30, 31—12 days. Cloudy, 3, 4, 5, 11, 12, 13, 20, 24, 26, 27, 28—11 days.

AUGUST.—Clear, 5, 22, 25—3 days. Partly cloudy, 3, 4, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 23, 24, 26, 27—16 days. Cloudy, 1, 2, 6, 8, 11, 14, 17, 20, 28, 29, 30, 31—12 days.

SEPTEMBER.—Clear, 3, 5, 18, 19, 20, 27, 28—7 days. Partly cloudy, 2, 4, 6, 8, 11, 12, 17, 29—8 days. Cloudy, 1, 7, 9, 10, 13, 14, 15, 16, 21, 22, 23, 24, 25, 26, 30—15 days.

OCTOBER.—Clear, 0. Partly cloudy, 9, 13, 16, 17, 18, 22, 24—7 days. Cloudy, 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 14, 15, 19, 20, 21, 23, 25, 26, 27, 28, 29, 30, 31—24 days.

NOVEMBER.—Clear, 26. Partly cloudy, 7, 8. Cloudy, 1, 2, 3, 4, 5, 6, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, 29, 30—27 days.

DECEMBER.—Clear, 22, 27, 28—3 days. Partly cloudy, 3, 4, 14, 15, 19, 20—6 days. Cloudy, 1, 2, 5, 6, 7, 8, 9, 10, 11, 12, 13, 16, 17, 18, 21, 23, 24, 25, 26, 29, 30, 31—22 days.

ASHTON.

APRIL.—Clear, 1, 2, 8, 12, 13, 14, 15, 16, 17, 23, 24, 25, 26, 27, 28, 29, 30—17 days. Cloudy, 3, 4, 5, 6, 7, 9, 10, 11, 18, 19, 20, 21, 22—13 days.

MAY.—Clear, 4, 7, 8, 9, 11, 12, 13, 25, 26, 28—10 days. Cloudy, 1, 2, 3, 5, 6, 10, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 27, 29, 30, 31—21 days.

JUNE.—Clear, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 19, 20, 21, 22, 26, 27, 28, 29, 30—24 days. Cloudy, 14, 17, 18, 23, 24, 25—6 days.

JULY.—Clear, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31—30 days. Cloudy, 20.

AUGUST.—Clear, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31—28 days. 11, 14, 15—3 days.

SEPTEMBER.—Clear, 1, 2, 3, 4, 5, 6, 8, 10, 11, 12, 16, 17, 18, 19, 20, 25, 26, 27, 28, 29—20 days. Cloudy, 7, 9, 13, 14, 15, 21, 22, 23, 24, 30—10 days.

OCTOBER.—Clear, 1, 6, 9, 11, 14, 15, 16, 17, 18, 20, 22, 24—12 days. Cloudy, 2, 3, 4, 5, 7, 8, 10, 12, 13, 19, 21, 23 25, 26, 27, 28, 29, 30, 31—19 days.

NOVEMBER.—Clear, 1, 8, 10, 11, 17, 25, 28—7 days. Cloudy, 2, 3, 4, 5, 6, 7, 9, 12, 13, 14, 15, 16, 18, 19, 20, 21, 22, 23, 24, 26, 27, 29, 30—23 days.

DECEMBER.—Clear, 3, 4, 5, 6, 14, 15, 19, 20, 21, 23, 25, 26, 27, 28—14 days. Cloudy, 1, 2, 7, 8, 9, 10, 11, 12, 13, 16 17, 18, 23, 24, 29, 30, 31—17 days.

PORT HURON.

JANUARY.—Clear, 1, 3, 7, 8, 12, 13, 19, 25—8 days. Partly cloudy, 2, 4, 10, 11, 14, 17, 21, 26, 27, 28, 31—11 days. Cloudy, 5, 6, 9, 15, 16, 18, 20, 22, 23, 24, 29, 30—13 days.

FEBRUARY.—Clear, 6, 18, 21, 22, 23, 24, 25, 26, 27, 28—10 days. Partly cloudy, 1, 2, 5, 8, 15, 16, 17, 19, 20—9 days. Cloudy, 3, 4, 7, 9, 10, 11, 12, 13, 14—9 days.

MARCH.—Clear, 2, 3, 10, 11, 12, 16, 17, 29—8 days. Partly cloudy, 4, 7, 8, 9, 14, 15, 18, 23, 24, 25, 26, 30—12 days. Cloudy, 1, 5, 6, 13, 19, 20, 21, 22, 27, 28, 31—11 days.

APRIL.—Clear, 2, 8, 12, 13, 14, 15, 16, 24, 25, 26, 27, 29—12 days. Partly cloudy, 1, 4, 6, 9, 17, 28, 30—7 days. Cloudy, 3, 5, 7, 10, 11, 18, 19, 20, 21, 22, 23—11 days.

MAY.—Clear, 7, 8, 9, 10, 11, 12, 13, 22, 25, 26—10 days. Partly cloudy, 4, 6, 14, 24, 27, 28, 29, 31—8 days. Cloudy, 1, 2, 3, 5, 15, 16, 17, 18, 19, 20, 21, 23—12 days.

JUNE.—Clear, 5, 6, 8, 9, 10, 14, 15, 16, 20, 21, 23, 29, 30—13 days. Partly cloudy, 3, 4, 7, 11, 12, 13, 17, 18, 19, 22, 24, 25, 26, 27—14 days. Cloudy, 1, 2, 28—3 days.

JULY.—Clear, 1, 2, 3, 5, 7, 8, 9, 15, 17, 18, 19, 22, 25, 26, 27, 29, 30—17 days. Partly cloudy, 4, 6, 10, 12, 13, 14, 16, 23, 28, 31—10 days. Cloudy, 11, 20, 21, 24—4 days.

AUGUST.—Clear, 1, 2, 4, 5, 10, 12, 13, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25—17 days. Partly cloudy, 6, 7, 9, 11, 26, 31—6 days. Cloudy, 3, 8, 14, 15, 27, 28, 29, 30—8 days.

SEPTEMBER.—Clear, 2, 3, 8, 9, 11, 12, 14, 16, 18, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30—19 days. Partly cloudy, 1, 5, 7, 15, 23—5 days. Cloudy, 4, 6, 10, 13, 17, 19—6 days.

OCTOBER.—Clear, 1, 6, 11, 14, 16, 17, 18, 21, 25, 26, 29—11 days. Partly cloudy, 3, 7, 8, 15, 19, 20, 24, 27, 28—9 days. Cloudy, 2, 4, 5, 9, 10, 12, 13, 22, 23, 30, 31—11 days.

NOVEMBER.—Clear, 11, 17, 19, 25, 27—5 days. Partly cloudy, 1, 2, 4, 6, 10, 12, 16, 18, 20, 22, 28—11 days. Cloudy, 3, 5, 7, 8, 9, 13, 14, 15, 21, 23, 24, 26, 29, 30—14 days.

DECEMBER.—Clear, 4, 5, 14, 15, 18, 19, 20, 23, 28—9 days. Partly cloudy, 3, 6, 9, 16, 22, 25, 31—7 days. Cloudy, 1, 2, 7, 8, 10, 11, 12, 13, 17, 21, 24, 26, 27, 29, 30—15 days.

THORNVILLE.

In the following statement relative to Thornville, are named for each of the months, January to December, the days of the month "sunny," "fair" and "cloudy" (the *per cent* of sunshine having been recorded for each day), the days are named sunny when the sky was three-tenths or less than three-tenths covered with clouds; fair, when the sky was four-tenths to seven-tenths (inclusive) covered; cloudy, when the sky was more than seven-tenths covered, as observed by J. S. Caulkins, M. D., Thornville.

JANUARY.—Clear, 2, 7, 8, 9, 10, 11, 12, 13, 19, 26, 28—11 days. Fair, 1, 3, 14, 18, 21, 23, 25, 27, 31—9 days Cloudy, 4, 5, 6, 15, 16, 17, 20, 22, 24, 29, 30—11 days.

FEBRUARY.—Clear, 1, 2, 5, 6, 16, 18, 19, 21, 23, 24, 25, 26, 27, 28—14 days. Fair, 4, 7, 8, 11, 22—5 days. Cloudy, 3, 9, 10, 12, 13, 14, 15, 17, 20—9 days.

MARCH.—Clear, 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 16, 17, 18, 19, 29, 30, 31—19 days. Fair, 13, 15, 20, 21, 23, 24, 26, 27—8 days. Cloudy, 6, 22, 25, 28—4 days.

APRIL.—Clear, 3, 6, 8, 12, 13, 14, 15, 16, 17, 18, 24, 25, 26, 27, 29, 30—16 days. Fair, 1, 4, 19, 23—4 days Cloudy, 2, 5, 7, 9, 10, 11, 20, 21, 22, 28—10 days.

MAY.—Clear, 1, 3, 4, 7, 8, 9, 11, 12, 13, 24, 26, 28, 31—13 days. Fair, 5, 10, 14, 16, 17, 23, 25, 27, 29—9 days. Cloudy, 2, 6, 15, 18, 19, 20, 21, 22, 30—9 days.

JUNE.—Clear, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 27, 29, 30—23 days. Fair, 18, 19, 23, 24, 25, 26—6 days. Cloudy, 28.

JULY.—Clear, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31—21 days. Fair, 11. Cloudy, 20.

AUGUST.—Clear, 1, 2, 4, 5, 6, 7, 10, 12, 13, 15, 16, 17, 19, 20, 21, 23, 23, 24, 26, 27, 28, 31—22 days. Fair, 9, 11, 14, 30—4 days. Cloudy, 3, 8, 18, 25, 29—5 days.

SEPTEMBER.—Clear, 1, 2, 3, 4, 6, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29, 30—24 days. Fair, 5, 8, 13, 22, 23—5 days. Cloudy, 7.

OCTOBER.—Clear, 1, 3, 11, 14, 15, 16, 17, 18, 19, 20, 21, 26, 27, 28, 29—15 days. Fair, 2, 4, 6, 7, 22, 25—6 days. Cloudy, 5, 8, 9, 10, 12, 13, 23, 24, 30, 31—10 days.

NOVEMBER.—Clear, 1, 6, 17, 24, 25, 27, 28—7 days. Fair, 2, 3, 5, 11, 12, 18, 19, 20, 23—9 days. Cloudy, 4, 7, 8, 9, 10, 13, 14, 15, 16, 21, 22, 26, 29, 30—14 days.

DECEMBER.—Clear, 3, 4, 5, 6, 9, 14, 18, 19, 20, 22, 25, 27, 28—13 days. Fair, 15, 21, 26—3 days. Cloudy, 1, 2, 7, 8, 10, 11, 12, 13, 16, 17, 23, 24, 29, 30, 31—15 days.

LANSING.

JANUARY.—Sunny, 2, 13, 26—3 days. Partly cloudy, 1, 3, 7, 8, 9, 10, 11, 19, 27, 28—10 days. Cloudy, 4, 5, 6, 12, 14, 15, 16, 17, 18, 20, 21, 22, 23, 24, 25, 29, 30, 31—18 days.

FEBRUARY.—Sunny, 6, 13, 18, 24, 25, 26, 28—7 days. Partly cloudy, 4, 5, 21, 27—4 days. Cloudy, 1, 2, 3, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 19, 20, 23, 28—17 days.

MARCH.—Sunny, 2, 3, 10, 14, 29—5 days. Partly cloudy, 1, 5, 8, 9, 11, 13, 16, 17, 19—9 days. Cloudy, 4, 6, 7, 12, 15, 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 30, 31—17 days.

APRIL.—Sunny, 3, 8, 12, 14, 15, 24, 25, 26, 29, 30—10 days. Partly cloudy, 13, 16, 17, 27—4 days. Cloudy, 1, 2, 4, 5, 6, 7, 9, 10, 11, 18, 19, 20, 21, 22, 23, 28—16 days.

MAY.—Sunny, 3, 4, 7, 8, 11, 12, 17, 26—8 days. Partly cloudy, 9, 10, 13, 16, 25, 28—6 days. Cloudy, 1, 2, 5, 6, 14, 15, 18, 19, 20, 21, 22, 23, 24, 27, 29, 30, 31—17 days.

JUNE.—Sunny, 2, 3, 4, 8, 9, 10, 12, 13, 14, 15, 16, 20, 21, 22, 27, 29, 30—17 days. Partly cloudy, 7, 11, 17, 19, 23, 24, 28—7 days. Cloudy, 1, 5, 6, 18, 25, 26—6 days.

JULY.—Sunny, 3, 5, 8, 9, 11, 13, 16, 17, 18, 19, 21, 22, 23, 25, 26, 27, 29, 30—18 days. Partly cloudy, 2, 4, 6, 7, 12, 15, 24, 31—8 days. Cloudy, 1, 13, 14, 20, 28—5 days.

AUGUST.—Sunny, 1, 2, 4, 5, 7, 13, 16, 19, 21, 22, 23, 24, 25, 26, 27, 28, 29, 31—18 days. Partly cloudy, 6, 9, 12, 15, 17, 18, 30—7 days. Cloudy, 3, 8, 10, 11, 14, 20—6 days.

SEPTEMBER.—Sunny, 1, 2, 3, 11, 16, 17, 18, 19, 20, 24, 26, 27, 28, 29, 30—15 days. Partly cloudy, 4, 5, 21, 25—4 days. Cloudy, 6, 7, 8, 9, 10, 12, 13, 14, 15, 22, 23—11 days.

OCTOBER.—Sunny, 3, 11, 16, 17, 18, 27—6 days. Partly cloudy, 1, 14, 15, 25—4 days. Cloudy, 2, 4, 5, 6, 7, 8, 9, 10, 12, 13, 19, 20, 21, 22, 23, 24, 26, 28, 29, 30, 31—21 days.

NOVEMBER.—Sunny, 10, 11, 28—3 days. Partly cloudy, 15, 17, 23, 25, 27—5 days. Cloudy, 1, 2, 3, 4, 5, 6, 7, 8, 9, 12, 13, 14, 16, 18, 19, 20, 21, 22, 24, 26, 29, 30—22 days.

DECEMBER.—Sunny, 4, 5, 6, 14, 19, 20, 21, 25—8 days. Partly cloudy, 3, 15, 27, 28—4 days. Cloudy, 1, 2, 7, 8, 9, 10, 11, 12, 13, 16, 17, 18, 22, 23, 24, 26, 29, 30, 31—19 days.

ALBION.

JANUARY.—Sunny, 2, 3, 10, 13—4 days. Fair, 1, 3, 7, 9, 11, 12, 18, 19, 21, 23, 25, 26, 27, 28, 31—15 days. Cloudy, 4, 5, 6, 14, 15, 16, 17, 20, 22, 24, 29, 30—12 days.

FEBRUARY.—Sunny, 6, 13, 15, 24, 25, 26, 28—7 days. Fair, 1, 2, 4, 5, 15, 21, 22, 23, 27—9 days. Cloudy, 3, 7, 8, 9, 10, 11, 12, 14, 16, 17, 19, 20—12 days.

RCH.—Sunny, 2, 10, 11, 14—4 days. Fair, 1, 3, 6, 8, 9, 12, 13—7 days. Cloudy, 4, 5, 7—3 days.*

IL.—Sunny, 2, 8, 12, 15, 16, 24, 25, 26, 29, 30—10 days. Fair, 1, 4, 5, 6, 7, 11, 13, 14, 17, 19, 20, 22, 27, 28—
s. Cloudy, 3, 9, 10, 18, 21, 23—6 days.

Y.—Sunny, 3, 8, 11, 12, 13, 26, 28—7 days. Fair, 1, 2, 4, 5, 6, 7, 9, 10, 14, 16, 17, 23, 24, 25, 29, 31—16 days
ly, 15, 18, 19, 20, 21, 22, 27, 30—8 days.

E.—Sunny, 3, 8, 9, 10, 11, 14, 15, 16, 22, 28, 30—11 days. Fair, 1, 2, 4, 5, 6, 7, 12, 13, 19, 21, 23, 24, 25, 26—14
Cloudy, 17, 18, 20, 27, 29—5 days.

OBER.—Sunny, 1, 3, 11, 14, 15, 16, 17, 18, 22, 25, 27—11 days. Fair, 6, 20, 23, 24, 26, 28—6 days. Cloudy,
7, 8, 9, 10, 12, 13, 19, 21, 29, 30, 31—14 days.

VEMBER.—Sunny, 1, 10, 11, 15, 25, 27, 28—7 days. Fair, 6, 19, 23—3 days. Cloudy, 2, 3, 4, 5, 7, 8, 9, 12, 13,
17, 18, 20, 21, 22, 24, 26, 29, 30—20 days.

CEMBER.—Sunny, 4, 5, 6, 14, 15, 18, 19, 20—8 days. Fair, 9, 21, 25, 28—4 days. Cloudy, 1, 2, 3, 7, 8, 10,
13, 16, 17, 22, 23, 24, 26, 27, 29, 30, 31—19 days.

ANN ARBOR.

ANUARY.—Sunny, 3, 8, 10, 13—4 days. Fair, 1, 3, 7, 9, 11, 12, 18, 19, 21, 24, 25, 26, 27, 28, 31—15 days.
ody, 4, 5, 6, 14, 15, 16, 17, 20, 22, 23, 29, 30—12 days.

EBRUARY.—Sunny, 5, 6, 18, 22, 24, 25, 26, 28—8 days. Fair, 1, 2, 4, 15, 16, 19, 21, 23, 27—9 days. Cloudy, 3,
9, 10, 11, 12, 13, 14, 17, 20—11 days.

ARCH.—Sunny, 3, 3, 10—3 days. Fair, 8, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 25, 26, 29, 30, 31—16 days.
udy, 1, 4, 5, 6, 7, 9, 20, 22, 23, 24, 27, 28—12 days.

APRIL.—Sunny, 2, 8, 12, 16, 25, 26—6 days. Fair, 1, 4, 5, 6, 7, 13, 14, 15, 17, 24, 27, 29, 30—13 days. Cloudy,
9, 10, 11, 18, 19, 20, 21, 22, 23, 28—11 days.

MAY.—Sunny, 4, 7, 8, 11, 12, 13, 26—7 days. Fair, 1, 5, 6, 9, 14, 23, 24, 25, 28, 31—10 days. Cloudy, 2, 3, 10, 15,
17, 18, 19, 20, 21, 22, 27, 29, 30—14 days.

JUNE.—Sunny, 2, 3, 5, 7, 8, 9, 10, 12, 13, 14, 20, 21, 23, 27, 29, 30—16 days. Fair, 4, 6, 11, 15, 16, 19, 22, 24, 25—
days. Cloudy, 1, 17, 18, 26, 28—5 days.

JULY.—Sunny, 3, 4, 5, 7, 8, 9, 14, 15, 17, 18, 21, 22, 24, 25, 26, 27, 29, 30, 31—19 days. Fair, 2, 6, 10, 12, 13, 16,
23—8 days. Cloudy, 1, 11, 20, 28—4 days.

AUGUST.—Sunny, 2, 4, 5, 7, 12, 13, 14, 16, 21, 22, 23, 24, 26, 27, 28, 29, 31—17 days. Fair, 1, 3, 8, 9, 11, 15, 17, 19,
30—10 days. Cloudy, 6, 10, 18, 25—4 days.

SEPTEMBER.—Sunny, 1, 2, 3, 11, 14, 16, 20, 24, 25, 26, 27, 28, 29, 30—14 days. Fair, 5, 7, 10, 12, 13, 15, 18, 19,
22—10 days. Cloudy, 4, 6, 8, 9, 17, 23—6 days.

OCTOBER.—Sunny, 1, 11, 14, 16, 17, 18, 20, 25—8 days. Fair, 3, 4, 6, 15, 19, 21, 22, 26, 27, 30—10 days. Cloudy,
5, 7, 8, 9, 10, 12, 13, 23, 24, 28, 29, 31—13 days.

NOVEMBER.—Sunny, 1, 15, 17, 19, 23, 25, 28—7 days. Fair, 2, 3, 11, 20, 21, 24, 26, 27—8 days. Cloudy, 4, 5, 6,
8, 9, 10, 12, 13, 14, 16, 18, 22, 29, 30—15 days.

DECEMBER.—Sunny, 4, 5, 6, 9, 14, 15, 19, 20, 25, 29—10 days. Fair, 13, 18, 21, 27—4 days. Cloudy, 1, 2, 3, 7,
10, 11, 12, 16, 17, 22, 23, 24, 26, 29, 30, 31—17 days.

KALAMAZOO.

In the following statement relative to Kalamazoo, are named for each of the months, January to
ecember, the days of the month "sunny," "fair," and "cloudy" (the *per cent* of sunshine having been
corded for each day), the days are named sunny when the sky was three-tenths or less than three-tenths
vered with clouds; fair, when the sky was from four-tenths to seven-tenths (inclusive) covered; cloudy,
hen the sky was more than seven-tenths covered,—as observed for Wm. M. Edwards, M. D., Kalamazoo.

JANUARY.—Sunny, 2, 8, 12, 13, 19—5 days. Fair, 1, 7, 9, 10, 11, 25, 26, 28—8 days. Cloudy, 3, 4, 5, 6, 14, 15,
17, 18, 20, 21, 22, 23, 24, 27, 29, 30, 31—18 days.

* No record for the rest of the month.

FEBRUARY.—Sunny, 4, 6, 13, 18, 24, 25, 28—7 days. Fair, 1, 7, 16, 26—4 days. Cloudy, 2, 3, 5, 8, 9, 10, 11, 14, 15, 17, 19, 20, 21, 22, 23, 27—17 days.

MARCH.—Sunny, 2, 8, 10, 11, 29—5 days. Fair, 9, 13, 14, 15, 16, 17, 19, 21, 30—9 days. Cloudy, 1, 4, 5, 6, 8, 12, 18, 20, 22, 23, 24, 25, 26, 27, 28, 31—17 days.

APRIL.—Sunny, 12, 13, 14, 25, 26, 30—6 days. Fair, 1, 2, 8, 15, 16, 17, 23, 24, 27, 28, 29—11 days. Cloudy, 4, 5, 6, 7, 9, 10, 11, 18, 19, 20, 21, 22—13 days.

MAY.—Sunny, 3, 4, 6, 8, 11, 12, 13, 25, 26, 28, 29—11 days. Fair, 7, 9, 14, 16, 17, 31—6 days. Cloudy, 1, 10, 15, 18, 19, 20, 21, 22, 23, 24, 27, 30—14 days.

JUNE.—Sunny, 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 19, 20, 21, 22, 23, 24, 26, 27, 29, 30—24 days. Fair, 17, 25, 28—4 days. Cloudy, 18.

JULY.—Sunny, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 23, 24, 25, 28, 27, 28, 29, 30, 31—days. Fair, 1. Cloudy, 20.

AUGUST.—Sunny, 1, 2, 3, 4, 5, 7, 8, 9, 12, 13, 14, 16, 17, 18, 19, 21, 22, 23, 24, 26, 27, 28, 30, 31—24 days. Fair, 10, 15, 20, 25—5 days. Cloudy, 11, 29—2 days.

SEPTEMBER.—Sunny, 1, 2, 7, 9, 10, 11, 12, 16, 18, 19, 20, 21, 25, 26, 27, 28, 29—17 days. Fair, 3, 4, 5, 8, 13, 14, 22, 24, 30—10 days. Cloudy, 6, 17, 23—3 days.

OCTOBER.—Sunny, 1, 3, 6, 11, 16, 17, 18, 19, 25, 27—10 days. Fair, 10, 13, 15, 20, 22, 24, 28—7 days. Cloudy, 2, 4, 5, 7, 8, 9, 12, 14, 21, 23, 26, 29, 30, 31—14 days.

NOVEMBER.—Sunny, 1, 10, 11, 25, 27, 28—6 days. Fair, 6, 8, 15, 17, 20, 22, 23, 24—8 days. Cloudy, 3, 3, 4, 5, 7, 9, 12, 13, 14, 16, 18, 19, 21, 26, 29, 30—16 days.

DECEMBER.—Sunny, 4, 5, 6, 14, 15, 19, 20, 25, 27—9 days. Fair, 8, 9, 21—3 days. Cloudy, 1, 2, 3, 7, 10, 11, 12, 13, 16, 17, 18, 22, 23, 24, 26, 28, 29, 30, 31—19 days.

DETROIT.

JANUARY.—Clear, 2, 8, 13, 19, 25—5 days. Partly cloudy, 1, 3, 4, 7, 9, 10, 11, 12, 23, 26, 27, 28, 30—13 days. Cloudy, 5, 6, 14, 15, 16, 17, 18, 20, 21, 22, 24, 29, 31—13 days.

FEBRUARY.—Clear, 1, 5, 16, 18, 21, 22, 24, 25, 26, 28—10 days. Partly cloudy, 2, 11, 12, 19, 23, 27—6 days. Cloudy, 3, 4, 6, 7, 8, 9, 10, 12, 14, 15, 17, 20—12 days.

MARCH.—Clear, 2, 3, 9, 10, 14, 16, 18, 29, 30—9 days. Partly cloudy, 1, 5, 7, 8, 11, 12, 13, 17, 20, 23—10 days. Cloudy, 4, 6, 15, 19, 21, 23, 24, 25, 26, 27, 28, 31—12 days.

APRIL.—Clear, 2, 8, 12, 13, 14, 15, 16, 17, 25, 26, 22, 29, 30—13 days. Partly cloudy, 4, 6, 13, 24, 27—5 days Cloudy, 1, 3, 5, 7, 9, 10, 11, 19, 20, 21, 22, 23—12 days.

MAY.—Clear, 3, 4, 7, 8, 11, 12, 13, 26—8 days. Partly cloudy, 1, 2, 6, 9, 10, 14, 17, 23, 24, 25, 27, 28, 29—13 days. Cloudy, 5, 15, 16, 18, 19, 20, 21, 22, 30, 31—10 days.

JUNE.—Clear, 3, 8, 9, 10, 11, 14, 15, 16, 20, 21, 22, 23, 29, 30—14 days. Partly cloudy, 1, 2, 4, 5, 6, 12, 13, 18, 19, 24, 25, 26, 27, 28—14 days. Cloudy, 7, 17—2 days.

JULY.—Clear, 2, 3, 4, 5, 6, 7, 8, 9, 13, 15, 17, 18, 22, 24, 25, 26, 27, 29, 30—19 days. Partly cloudy, 1, 10, 11, 12, 14, 16, 19, 20, 21, 23, 28, 31—12 days.

AUGUST.—Clear, 2, 4, 5, 7, 13, 13, 16, 17, 18, 21, 22, 23, 24, 26, 27—15 days. Partly cloudy, 1, 6, 10, 15, 19, 25, 28, 30, 31—10 days. Cloudy, 3, 8, 9, 11, 14, 29—6 days.

SEPTEMBER.—Cloudless days, 15. Partly cloudy, 10. Cloudy, 5.

OCTOBER.—Cloudless days, 10. Partly cloudy, 7. Cloudy, 14.

NOVEMBER.—Cloudless days, 7. Partly cloudy, 11. Cloudy, 12.

DECEMBER.—Cloudless days, 9. Partly cloudy, 5. Cloudy, 17.

THE TIME OF GREATEST PREVALENCE OF EACH DISEASE.

CONTRIBUTIONS TO THE STUDY OF THE CAUSES OF SICKNESS.

A STATISTICAL REPORT BASED ON WEEKLY REPORTS OF SICKNESS IN MICHIGAN DURING THE YEAR 1894, AND PRECEDING YEARS.

BY THE SECRETARY OF THE STATE BOARD OF HEALTH.

This paper is the eighteenth in a series of articles upon the same general subject begun in the latter part of 1876. It presents a summary of the compilation of weekly reports of sickness in Michigan in 1894. It includes a series of diagrams or graphic illustrations which show by months in 1894, the rise and fall of twenty-eight of the most prominent diseases in Michigan.

Propositions are stated as to the relations of specified meteorological conditions, and diseases are mentioned under these propositions in such manner as to suggest one method of studying some of the facts brought out in the compilation.

Tables are given showing the per cent of the weekly *reports* which stated the presence of the various diseases, first (in Exhibit IV.), for each of the years 1882–1894, and an average for 1877-1893, also for the eight years, 1886-1893, and secondly (in Exhibit IV., continued), by months, in each of the years 1893, 1894, and the average for the period of seventeen years, 1877-1893, also for the period of eight years, 1886-1893, the diseases being arranged in the order of their greatest reported prevalence in 1894, to facilitate a comparison with the prevalence of the same diseases in previous years, and in corresponding months in previous years.

The per cent of *observers* stating the presence of each of the diseases is given in Table 1, for the year 1894, and, for comparison, for each of the years 1882-1893, and, in Table 1, continued, for the months in the year 1894, and, for comparison, by months in the year, 1893 and the average by months for the period 1877-1893, also for the period of eight years, 1886-1893.

Comparing Table 1, with exhibit IV., we see the correspondence in the two lines of evidence,—that of the "prevalence" of the diseases as shown by the per cent of *reports*, and the "area of prevalence" as shown by the per cent of *observers*, the diseases following each other in a somewhat similar order from highest to lowest—the diseases being arranged in the table, as in the exhibit, in the order of their greatest reported prevalence in 1894.

One of the objects of this compilation is to learn the time of the greatest and of the least prevalence of each of the more important diseases in the State, and to note the connection of this prevalence with each of the meteorological conditions in the State. Casual observation shows that certain diseases are much more prevalent in the hot months, while certain other diseases are much more prevalent in the cold months. The relation between these diseases and the atmospheric temperature is well marked, but accurate statistics are needed to show just what that relation is. We find, also, that other meteorological conditions than atmospheric temperature have a marked effect upon many of the diseases, apparently diminishing the effect of temperature in some instances, increasing its effect in other instances. For these reasons the State Board of Health undertakes, by a compilation of the weekly reports of sickness in connection with the various meteorological conditions, to learn what causal relations exist between the humidity of the air, the ozone, the velocity of the wind, the atmospheric pressure, etc., and the increased or diminished prevalence of each disease in certain months as compared with other months in the same year, or with the same months in other years or series of years.

Since 1876, when this system of "weekly reports of sickness" was begun, an important work has been accomplished in learning the time of the greatest prevalence of each of several of the most important diseases, and consequently the time of greatest danger from each such disease, in the State considered as a unit. To facilitate the study of the causes of sickness and deaths, the State is divided into eleven geographical divisions, a list of which, and the counties embraced in each, appear in Exhibit I., page 87. From some of these divisions sufficient data are not yet received to make the study of the comparative prevalence of diseases in different parts of the State practicable. The number of reports from localities in the newer parts of the State is increasing, however, and a comparison of sickness by localities may soon become practicable.

PHYSICIANS' WEEKLY REPORTS OF SICKNESS.

Weekly reports are now received concerning twenty-eight diseases, the names of which are printed on the blank postal used for the weekly report; and concerning these twenty-eight diseases a positive report is made each week by each of many of the leading physicians in Michigan.

Great credit is due the busy medical practitioners in Michigan who forward these reports of sickness. Some of them have made the reports regularly since this plan was adopted in 1876. The service is, as a rule, without compensation; a few health officers have slight pay from their local boards of health. Each one should have full compensation. No other class of persons has knowledge of the facts that are necessary in the compilation of health statistics; and it is greatly to the credit of physicians that they are so willing to coöperate in every effort made to advance the public health.

PLAN OF THE WEEKLY CARD-REPORTS.

The plan of the weekly reports remains the same as last year. (Cards having *Pleuritis* printed on them were first used for weekly reports in October, 1887.) Observers now report only the diseases under their own personal observation. Previous to the year 1885, some of the observers reported such diseases as they believed to be present in their locality, even though not under their own observation. The change in method of making the reports may account partially for the apparent decrease in sickness

en compared with the average for the seventeen years, 1877-93. the method of securing and the plan of marking these reports s stated:—

the weekly reports are printed on postal cards, which are supplied to the observers of record books in which to preserve copies of the reports, remarks, etc., are also supplied rs, to be retained by them. The reports are forwarded weekly to the Secretary of the Health at Lansing.

aking the report is as follows: Each observer is requested to mark the disease of which eatest number of cases under his observation during the week for which the report is which there was the next greatest number of cases, 2; the next, 3; and so on, applying bers to the diseases reported present; but marking with the *same* figure all diseases of e same number of cases; to write 0 opposite each disease mentioned of which there was y these numbers without regard to the severity of the cases; to include all cases, without hey were taken sick, so long as they are actually sick with the given disease; to include the observation" of the observer. A blank is left on the card for the convenience of who prefer to state the number of cases rather than the order of prevalence by the fore-

he method of making the reports, the following copy of one of the blanks now in use is marked, in the "prevalence" column, for the number of cases stated on the right-hand uld be remembered that the numbers in the "prevalence" column denote simply the relative he several diseases appear to be prevalent, and do not denote a definite number of cases; might one week be marked *4*, and the following week, with the same number of cases, ames of diseases and figures printed in italics are not *printed* on the postal blanks, but have been *written* on the report by the observer.

Diseases in _____ and vicinity.

☞ PLEASE DATE. ☜

Week ending Sat., _____, *189*____

REMARKS:—

Ed. 38.

a. Please mark the disease of which there is the greatest number of cases, 1; the disease having next greatest number of cases, 2; the next, 3; and so on for each disease, writing the same figures opposite diseases having the same number of cases. Write 0 opposite each disease of which there is no case under your observation. [For full statement of plan, see second, third, and fourth pages of record-book cover.] A blank indicates that the item has been overlooked.

If this report includes a contagious disease, please mention, on the bottom or margin of this card, the township, city, or village in which the disease is.

Please mail this, ☞ signed and dated, ☜ as soon as convenient after close of week specified.

DISEASES, CASES OBSERVED.	Preval'nce Order. See a	No. of Cases.
Brain, Inflammation of	*14*	*1*
Bowels, Inflammation of	*12*	*3*
Bronchitis	*11*	*4*
Cerebro-spinal Meningitis	*0*	*0*
Cholera Infantum	*8*	*9*
Cholera Morbus	*10*	*6*
Consumption, Pulmonary	*10*	*6*
Croup, Membranous	*12*	*3*
Diphtheria	*5*	*14*
Diarrhea	*3*	*17*
Dysentery	*8*	*9*
Erysipelas	*13*	*2*
Fever, Intermittent	*2*	*21*
Fever, Remittent	*11*	*4*
Fever, Typhoid (Enteric)	*0*	*0*
Fever, Typho-malarial	*9*	*7*
Influenza	*7*	*11*
Kidney, Inflammation of	*14*	*1*
Measles	*1*	*27*
Neuralgia	*14*	*1*
Pleuritis	*0*	*0*
Pneumonia	*9*	*7*
Puerperal Fever	*0*	*0*
Rheumatism	*6*	*12*
Scarlatina	*4*	*16*
Small-pox	*0*	*0*
Tonsillitis	*11*	*4*
Whooping-cough	*0*	*0*
Mumps	*6*	*12*
Dyspepsia	*11*	*4*

_____ *M. D.*

BULLETINS OF HEALTH IN MICHIGAN.

During the year 1894 the issue of weekly and monthly bulletins of "Health in Michigan" has been continued. The weekly bulletin is compiled from the physicians' weekly reports from all parts of the State. It is designed to give, each week, information to the members of the State Board of Health and to the public concerning the diseases which cause most sickness in the State, the relative amount of sickness compared with the preceding week—thus showing any sudden increase or decrease which may have occurred in the prevalence of any disease, together with a similar comparison of the various meteorological conditions; also, a list of the localities in which each of the dangerous communicable diseases is reported present. This system enables the Secretary of the State Board of Health to "have his finger on the public pulse,"—to constantly be informed of the conditions of health throughout the State. If the newspapers would publish the localities where dangerous communicable diseases are, the information would be valuable to parents who might thus be enabled to avoid taking their children to such places until after the disease had ceased and thorough disinfection had occurred. A copy of this bulletin has been sent to such editors as have expressed a desire to have it for use, entire or in part, in their papers. About fifty copies are now used for this purpose each week. An abstract of it has been sent to the Michigan Associated Press, until October 3, 1894. The monthly bulletin is similar in character to the weekly bulletin; it shows the relative amount of sickness compared with the average for corresponding months in previous years, and compared with the preceding month, together with a similar comparison of the various meteorological conditions. It is issued as soon as possible after the close of each month, and is sent to the sanitary and medical journals which are received as exchanges by the library of the State Board of Health. About one hundred and five copies are thus used at the present time.

As a rule, about five-eighths of the card reports reach the office of the State Board of Health in time for compilation in the weekly bulletin, and the monthly bulletins are compiled from the information used in the weekly bulletins. It is found that the statements made in the monthly bulletins are corroborated by the information, after the close of the year, from the compilation of the whole number of the reports for the corresponding months of the year.

ANNUAL COMPILATION OF THE WEEKLY REPORTS.

The reports from each locality are compiled by months. The average of the numbers stating the order of prevalence of the several diseases for the month is considered an indication of the actual order of prevalence of the diseases for that time. There is also found for each locality what per cent of the reports state the presence of each disease for the given month. This per cent of reports for a single locality indicates what part of the month the disease was present in that locality. It may also be called the per cent of weeks the disease was present. These first results of the compilation are stated in Table 3, which, on account of the space required, has not been printed in the reports since that of 1882, but is preserved in the office of the State Board for reference and study.

A combination of the statements for localities in Table 3, is made by months for the State, so far as it is represented by the localities from which reports are received, showing: (1) What per cent of the observers reported each disease each month; (2) for the localities at which a given disease was reported, an average of the per cent of weeks it was reported at those localities; (3) what per cent of all the reports received for the month stated the presence of each disease; (4) an average of the numbers denoting the order of prevalence of each disease at the localities at which it was reported present during the month.

THE PREVALENCE OF THE SEVERAL DISEASES IN 1894.

By noting the per cent of all the reports received for a given time which stated the presence of each disease, the relative prevalence of the several diseases may be readily seen. This per cent has been computed for each disease, by months for the year 1894. It is thus stated in Exhibit II., page 88, which also states the per cent for each disease for the year 1894, and an average for the period of seventeen years, 1877-93, also for the period of eight years, 1886-93. What per cent of the reports stated the presence of each disease by months in 1894, is graphically represented in Diagrams 1–5 on page 89 and following pages.

For twenty diseases a comparison has been made of the amount of sickness in 1894 (as indicated by the proportion of reports stating the presence of the disease) with the average amount for a period of seventeen years, also for a recent period of eight years. These comparisons are shown in Exhibits XI., XIII., XVIII., and XX. A comparison is made in Table 1, on pages 97, 98 and 99 between the per cent of observers reporting the tabulated diseases present in each of the years 1882-1894, and by months in two of those years; also an average by months for the period of seventeen years 1877–93, also for the period of eight years, 1886-1893. In Exhibit IV., on pages 91, 92 and 93, the per cents of reports stating the presence of each of the twenty-eight tabulated diseases, for each of the years 1882-94, and an average by months for the years 1893 and 1894, and for the period of seventeen years, 1877-93, also for the period of eight years, 1886-1893, is given. In Table 1, and in Exhibit IV., the diseases are arranged in the order of the greatest per cents for 1894, the highest being placed first.

A study of the reported sickness from twenty-eight diseases, in connection with meteorological conditions by months in 1894, is made in Exhibit X., and following exhibits. By arranging months in order of greatest prevalence of the disease under consideration, noting whether it is more or less prevalent than the average for the year, and noting what were the meteorological conditions for the same months as compared with the average for the year, relations and comparisons are grouped for convenient comparison. A summary of one line of the evidence presented by these exhibits is given in Exhibits XXV. and XXVI.

In Exhibits VI. and VII., on subsequent pages, the leading diseases are arranged in order according to the amount of sickness reported from them in 1894, those from which there was most sickness reported being placed first. In these exhibits the diseases are arranged with reference to the per cent of reports taken in connection with the average order of prevalence.

The comparison with former years is facilitated by reference to Exhibit II., page 88, Table 1, pages 97, 98 and 99, Exhibit IV., pages 91, 92 and 93, and Exhibits XI., XIII., XVIII., and XX.

Exhibit IV., on pages 91, 92 and 93, is continued for 1894. In it the diseases are arranged in order of the greatest per cent of reports stating the presence of the diseases in 1894, the highest per cent being placed first in the line. It is similar in form to Table 1, page 97, which shows the per cent of observers by whom diseases were reported present. It affords a means of comparing the diseases showing greatest prevalence with those showing greatest area of prevalence or widest distribution. It affords also a means for the comparison of per cent of reports in 1894, with the average per cent of reports in the seventeen years, 1877–1893, also in the eight years, 1886-1893, both for the year and by months, also by months in 1894 with the year 1893.

DISEASES FROM WHICH THERE WAS A MARKED INCREASE OR DECREASE IN PREVALENCE IN MICHIGAN IN 1894.

By referring to Exhibits II. and IV. it will be seen that there is no disease which showed an increase in 1894 over the average for the seventeen years, 1877-1893. The diseases in which the decrease in 1894 appears most marked are intermittent fever, remittent fever, erysipelas, pneumonia, consumption, pleuritis and whooping-cough.

A part of the lessened prevalence of some of the prominent diseases may be due to the change in the method of reporting sickness, referred to in the last paragraph on page 82.

A comparison of 1894 with the average for the eight years, 1886-1893 shows that scarlet fever was the only disease in which there was a marked increase in 1894; and that intermittent fever, erysipelas, remittent fever, pneumonia and consumption are the only diseases in which there was a marked decrease in 1894.

Method of Comparison of Diseases by Years, Months, and Weeks.

In the Annual Reports ending with that for 1888, mention was made of diseases in which a difference of seven or more was shown between the per cents of reports stating the presence of the disease in the current year and in the preceding year or term of years; in the Reports since that for 1888 those diseases were mentioned of which the comparison showed an increase or decrease of twenty-five per cent from the preceding year, or from the normal, as the case may be.

In this report, those diseases which are reported by seven or more observers, and which show an increase or decrease of twenty-five per cent are generally mentioned, except in cases of cholera, small-pox, typhus fever or other particularly interesting or dangerous disease, and these are specially considered in each instance.

This rule was adopted also for the weekly and monthly bulletins "Health in Michigan," beginning with Feburary, 1893.

In exhibits XI., XIII., XVIII., and XX., the per cent of reports by months in 1894 is placed directly under the per cents for the corresponding months in 1893. A comparison between the corresponding months in the two years is thus made possible, and the comparison of the months in 1894 with the averages for the months in the series of years preceding is made possible by placing the differences, greater or less, in separate lines.

EXHIBIT I.—*Eleven Geographical Divisions of the State, formed for the purpose of facilitating the study of Causes of Sickness and of Deaths, with a list of Counties included in each Division.*

1.—Upper Peninsula.	2.—Northwestern.	3.—Northern.	4.—Northeastern.	5.—Western.	6.—Northern Central.	7.—Bay and Eastern.	8.—Central.	9.—Southwestern.	10.—Southern-Central.	11.—South eastern.
Alger.	Benzie.	Antrim.	Alcona.	Kent.	Clare.	Arenac.	Barry.	Allegan.	Branch.	Macomb.
Baraga.	Gr. Traverse.	Charlevoix.	Alpena.	Lake.	Gladwin.	Bay.	Clinton.	Berrien.	Calhoun.	Monroe.
Chippewa.	Leelanau.	Cheboygan.	Iosco.	Mason.	Isabella.	Huron.	Eaton.	Cass.	Hillsdale.	Oakland.
Delta.	Manistee.	Crawford.	Montmorency.	Muskegon.	Mecosta.	Lapeer.	Genesee.	Van Buren.	Jackson.	Wayne.
Dickinson.	Manitou.	Emmet.	Ogemaw.	Newago.	Midland.	Saginaw.	Gratiot.		Kalamazoo.	
Gogebic.	Wexford.	Kalkaska.	Oscoda.	Oceana.	Roscommon.	Sanilac.	Ingham.		Lenawee.	
Houghton.		Otsego.	Presque Isle.	Ottawa.	Missaukee.	St. Clair.	Ionia.		St. Joseph.	
Iron.					Osceola.	Tuscola.	Livingston.		Washtenaw.	
Isle Royal.							Montcalm.			
Keweenaw.							Shiawassee.			
Luce.										
Mackinac.										
Marquette.										
Menominee.										
Ontonagon.										
Schoolcraft.										

On pages 230 and 253 of the Report of this Board for 1885, the divisions and the counties in each were indicated by lines on maps of the State.

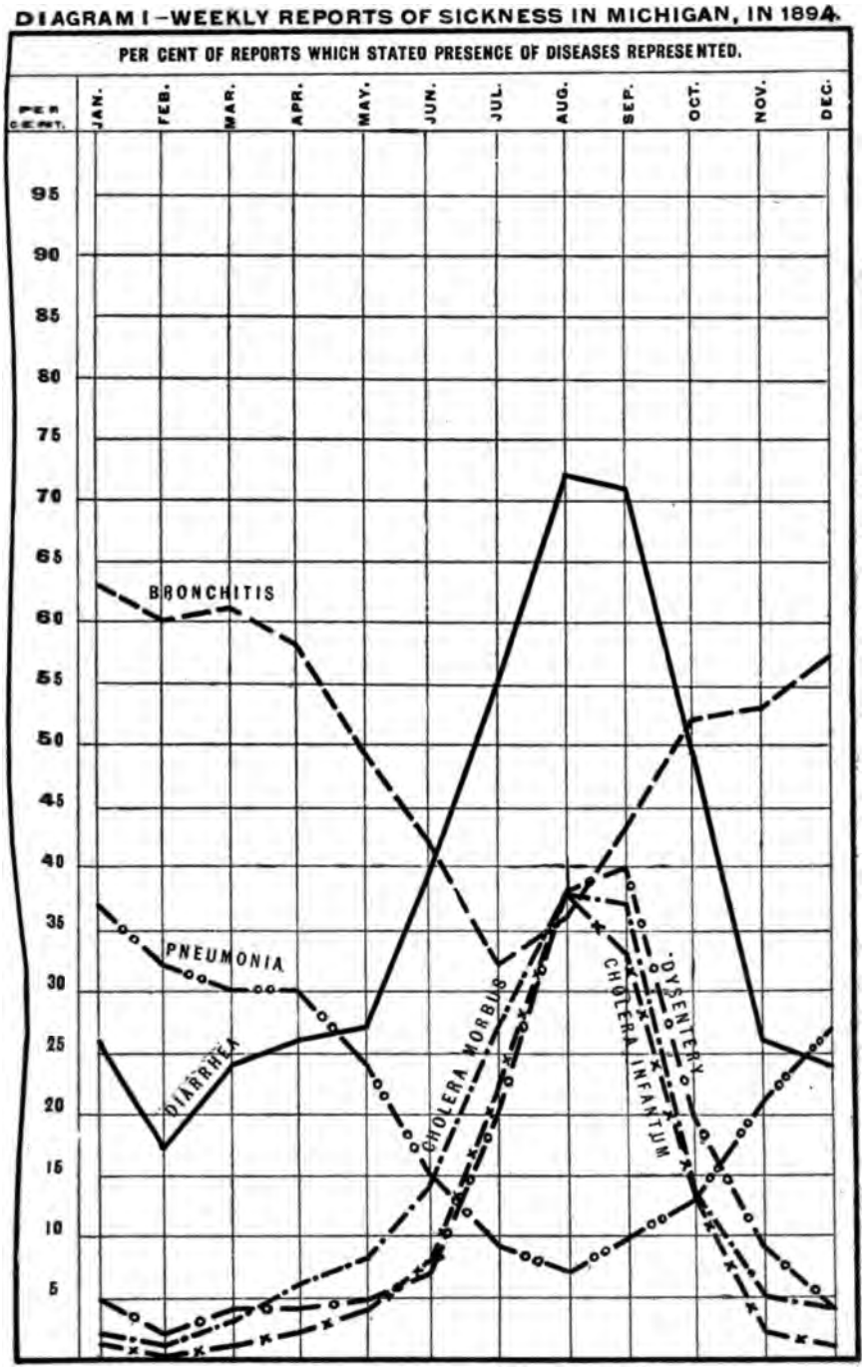
EXHIBIT II.—*Stating for each of 28 Diseases for the Year ending Saturday, l ber 29, 1894, by Months of the Year 1894, the average for the period for sev years, 1877-93, and the average for the period of eight years, 1886-93, on wh Cent of the reports received each Disease was stated to be present.—Compiled weekly reports by the Health Officers of Cities and Villages, by Regular Corre ents of the State Board of Health, and by other physicians.**

Diseases.	What Per Cent of the Reports received stated the Presence of the D													
	Av. 1877-1893.	Av. 1886-1893.	Av. year 1894.	Months, 1894.										
				Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept	Oct.	N
Average disease †	27	24	20	20	19	20	20	19	18	18	20	22	20	
Brain, inflam. of	5	5	3	2	3	3	6	4	4	2	4	5	3	
Bowels, inflam. of	15	14	13	13	11	14	14	12	13	13	18	15	11	
Bronchitis	60	58	50	63	60	61	58	49	42	32	36	43	52	
Cerebro-spi. meningitis	4	3	1	1	0.3	1	3	1	1	1	3	2	1	
Cholera infantum	13	12	12	1	0	1	2	4	8	22	38	33	13	
Cholera morbus	17	16	14	2	1	3	6	8	14	27	38	37	13	
Consumption, pulmonary	53	48	36	36	33	33	41	40	37	39	35	37	34	
Croup, membranous	5	4	2	3	2		2	3	2	1	0.3	0	4	
Diphtheria	16	8	7	5	8	8	6	6	7	4	7	8	9	
Diarrhea	46	44	40	26	17	24	26	27	39	55	72	71	49	
Dysentery	18	16	14	5	2	4	4	5	7	20	38	40	20	
Erysipelas	22	20	13	15	14	16	14	16	12	10	9	13	10	
Fever, intermittent	58	40	24	12	16	25	24	24	26	28	28	29	27	
Fever, remittent	39	28	20	12	14	14	17	14	20	20	23	28	28	
Fever, typhoid (enteric)	11	9	11	7	5	4	2	6	5	7	15	23	24	
Fever, typho-malarial	17	11	4	1	1	2	1	1	2	3	6	11	9	
Influenza	41	41	41	87	75	66	55	38	21	15	18	23	29	
Kidney, inflam. of	20	20	17	17	20	22	21	23	21	15	13	13	14	
Measles	11	9	6	2	5	9	15	19	13	5	2	1	0.4	
Neuralgia	65	64	56	63	59	64	61	57	51	51	47	52	56	
Pleuritis	18	13	13	17	16	17	19	14	11	10	7	11	12	
Pneumonia	33	27	20	37	32	30	30	24	15	9	7	10	13	
Puerperal fever	5	4	2		3	1	1	2	4	2	2	1	2	
Rheumatism	68	67	62	65	67	69	66	67	60	58	54	53	58	
Scarlet fever	15	10	14	9	14	13	17	16	15	12	11	14	17	
Small-pox	0.7	0.1	0.6	0	0	1		1	1	1	0.5	0	1	
Tonsillitis	48	47	42	54	51	50	50	44	30	32	30	31	40	
Whooping-cough	16	12	12	8	8	8	12	12	12	12	13	13	13	
Total No. reports rec'd	‡378	‡426	‡464	487	383	384	389	523	453	485	603	473	541	

* For 1894 the names of observers are stated in Exhibit V., pages 94 95 and 96.
† This line is an average for such of the tabulated diseases as were reported present in the given or year. ‡ Averages per month.

Statements in this exhibit for months in 1894 are graphically r sented in Diagrams 1, 2, 3, 4, 5, opposite this page, and on following p

DIAGRAM I—WEEKLY REPORTS OF SICKNESS IN MICHIGAN, IN 1894.



[PLATE 5 I 7]

EXHIBIT III.—*Stating, by Months of the Year ending Saturday, December 29, 1894, for the State, and for each of the Eleven Geographical Divisions of Michigan from which Weekly Reports of Diseases were received, the number of Observers from whom the Reports were received; the number of Reports received; the day on which, for the purposes of this compilation, each month is made to end; and the number of Weeks thus included in each Month.*

Months, 1894.	Months and Year end Saturday.	Number of Weeks.	State.		Divisions of the State.*																					
			1. Up. Peninsular.*		2. Northwestern.*		3. Northern.*		4. Northeastern.*		5. Western.*		6. Northern-Central.*		7. Bay and Eastern.*		8. Central.*		9. Southwestern.*		10. Southern-Central.*		11. Southeastern.*			
			Observers.‡	Reports.†	Observers.‡	Reports.†	Observers.‡	Reports.†	Observers.‡	Reports.†	Observers.‡	Reports.†	Observers.‡	Reports.†	Observers.‡	Reports.†	Observers.‡	Reports.†	Observers.‡	Reports.†	Observers.‡	Reports.†	Observers.‡	Reports.†		
Year, 1894 †.....	Dec. 29, 1894....	52	189	5,572	17	435	8	208	9	240	4	109	16	526	8	199	26	776	33	986	19	561	34	1,074	15	459
Av. per month.		--	116	464	9	36	5	17	5	20	2	9	11	44	4	17	16	65	21	82	12	47	22	90	10	38
January.....	February 3.....	5	102	487	8	40	2	9	4	20	2	10	9	43	2	10	15	70	20	96	12	55	21	100	7	34
February.....	March 3.....	4	103	383	8	31	3	9	5	15	2	8	8	30	3	12	15	60	19	70	11	39	22	84	7	25
March	March 31	4	102	381	9	33	2	8	5	20	2	8	9	36	3	9	15	55	19	70	11	39	20	79	7	27
April.....	April 28.	4	107	369	8	29	3	9	5	15	3	8	9	34	0	0	14	49	18	64	11	38	26	91	10	32
May	June 2.....	5	114	523	10	43	5	22	5	23	3	13	8	37	3	14	16	73	21	99	11	54	23	103	9	42
June	June 30.....	4	128	453	11	37	5	16	6	21	2	7	11	41	6	22	18	64	22	81	13	48	23	79	11	37
July.....	July 28.....	4	131	485	9	33	7	25	5	20	2	8	14	47	6	23	19	74	23	80	13	51	23	84	10	40
August.....	September 1....	5	131	603	9	42	7	32	6	27	2	10	13	61	7	27	16	76	23	105	13	59	23	107	12	57
September.....	September 29...	4	128	473	10	35	6	21	6	22	3	11	13	47	5	18	17	66	22	84	12	41	22	83	12	45
October	November 3	5	115	541	11	46	5	23	6	26	2	10	12	57	5	25	15	74	18	88	10	48	21	97	10	47
November	December 1.....	4	119	446	9	34	5	19	4	16	2	8	13	49	5	19	15	56	21	77	13	48	22	85	10	35
December	December 29....	4	116	425	9	32	4	15	4	15	2	8	12	44	5	20	16	59	20	72	12	41	22	82	10	37

* The counties in each division are given in Exhibit I., page 87. † From some of the observers reports were not received every week, so that the number of reports received does not equal the number of observers multiplied by the number of weeks in the given month or in the year.
‡ In some localities there were more observers than one. The whole number of localities from which reports were received was 164; the average number per month was 108. The names of observers and number of cards received from each observer for each month and for the year are stated in Exhibit V., pages 94, 95, 96.

'T IV.—*Stating for each of 28 Diseases, the average for the period of seventeen 1877–1893, and for each of the last twelve of those years and 1894, and for the of eight years, 1886–1893, on what Per Cent of the Reports received the Dis- ere stated to be present. Compiled from Weekly Reports by Health Officers es and Villages and by regular correspondents of the State Board of Health.* ued for each month of 1893 and 1894 on pages 92 and 93.*

seases.	What Per Cent of the Reports stated the Presence of the Disease.														
	Av. 1877-93.	Av. 1886-93.	1894.	1893.	1892.	1891.	1890.	1889.	1888.	1887.	1886.	1885.	1884.	1883.	1882.
) Diseases †...	27	24	20	20	21	25	25	23	24	25	26	26	29	30	30
atism	68	67	62	64	64	69	71	65	66	69	70	68	70	68	68
ria ‡.....	65	64	56	57	61	66	67	63	62	67	67	68	70	69	68
itis.....	60	58	50	53	54	60	65	58	59	55	56	56	61	66	65
itis ‡.....	48	47	42	49	48	49	50	46	41	47	49	50	50	50	48
za.....	41	41	41	43	42	55	53	32	32	33	35	34	41	43	40
a	46	44	40	40	43	47	44	45	41	48	45	46	52	49	48
ıption, Pul.‡	53	48	36	38	38	49	52	48	49	51	55	58	63	61	66
ittent fever.	58	40	24	24	27	36	41	43	45	48	54	59	65	69	71
ent fever....	39	28	20	18	21	28	27	30	34	32	34	36	44	41	48
onia.....	33	27	20	22	25	27	30	26	30	28	27	27	29	28	39
of kidney ‡..	20	20	17	17	21	20	21	20	19	18	20	21	26	-----	-----
fever.....	15	10	14	10	12	9	10	10	9	8	11	12	16	19	18
ı morbus ...	17	16	14	14	15	16	15	14	15	19	17	17	22	18	17
ery.....	18	16	14	13	15	16	16	17	17	19	17	15	23	21	17
ılas.....	22	20	13	14	16	19	21	22	24	24	23	24	26	25	22
of bowels ‡..	15	14	13	12	13	15	14	14	14	16	17	17	17	16	13
is ‡	18	13	13	14	18	21	19	17	18	-----	-----	-----	-----	-----	-----
ı infantum..	13	12	13	10	11	13	10	11	11	13	14	17	15	14	12
ing-cough...	16	12	12	9	10	9	9	16	9	14	20	14	23	15	17
d fever, (ent)	11	9	11	9	9	11	8	10	10	10	8	8	12	11	14
eria.....	16	8	7	7	7	6	8	6	7	10	13	14	15	17	25
.....	11	9	6	7	4	10	12	6	16	14	6	5	10	24	11
mal. fever ‡..	17	11	4	4	5	6	7	16	15	16	16	16	20	18	24
of brain ‡...	5	5	3	3	3	4	5	5	5	6	5	6	7	6	5
anocs croup	5	4	2	2	3	4	4	3	4	4	5	5	6	6	7
ral fever ..	5	4	2	3	4	3	4	5	4	6	5	6	7	7	7
-spi. men...	4	3	1	2	2	3	3	3	3	3	4	6	7	5	6
ox.....	0.7	0.1	0.6	0.3	.02	0	0.1	.03	.03	.02	0 4	0.2	0.1	0.3	3
orts rec'd...	§4,530	§5,111	5,572	5,853	5,281	4,291	4,939	5,000	5,047	4,896	5,583	5,108	3,957	4,458	4,745

‡ the number of observers, reports, weeks in each month, etc., are stated in the first five col- xhibit III., page 90, the names of the observers and the number of the reports received from ated in Exhibit V., pages 94, 95 and 96.
nbers opposite the names of the diseases do not state what per cent of the whole number of the year stated the disease to be present at some time during the year, but state (on an average months of the year), what per cent of reports for the several months stated the disease to be those months. The column for each year is thus a statement for an average month of that year. following pages of this table, however, the columns for each month state what per cent of for that month (the number of which is stated at the foot of the column) stated the given be present in that month. [‡ For foot-note see a subsequent page.] § Average per year.

EXHIBIT IV.—CONTINUED.—*Stating for each of 28 Diseases by months, on what Per and 1894; also the Averages by Months for the Period of eight*

What Per Cent of the Reports Received Stated Presence of the Disease.‡

Line number.	January.* Diseases.	Av. '77-'93.	Av. '86-'93.	1894.	1893.	February.* Diseases.	Av. '77-'93.	Av. '86-'93.	1894.	1893.	March.* Diseases.	Av. '77-'93.	Av. '86-'93.	1894.	1893.
	Average Disease†.	28	25	20	21	Average Disease†.	28	25	19	21	Average Disease†.	28	25	10	19
1	Influenza	60	63	87	56	Influenza	64	66	75	58	Rheumatism	73	73	69	69
2	Rheumatism	72	70	65	66	Rheumatism	72	70	67	67	Influenza	61	63	66	57
3	Neuralgia	68	68	63	57	Bronchitis	75	72	60	67	Neuralgia	72	71	64	65
4	Bronchitis	74	70	63	67	Neuralgia	70	70	59	62	Bronchitis	74	71	61	62
5	Tonsillitis	59	58	54	62	Tonsillitis	60	59	51	59	Tonsillitis	59	59	50	61
6	Pneumonia	54	47	37	34	Consumption, Pul.	59	50	33	38	Consumption, Pul.	61	52	33	43
7	Consumption, Pul.	58	50	36	35	Pneumonia	57	49	32	36	Pneumonia	54	45	30	34
8	Diarrhea	27	28	26	28	Inflam. of Kidney	22	20	20	18	Intermittent Fever	51	35	25	18
9	Inflam. of Kidney	22	20	17	19	Diarrhea	28	28	17	25	Diarrhea	29	29	24	25
10	Pleuritis	...	27	17	21	Intermittent Fever	48	34	16	14	Inflam. of Kidney	23	22	22	20
11	Erysipelas	25	23	15	14	Pleuritis	...	27	16	20	Pleuritis	...	27	17	21
12	Inflam. of Bowels	13	13	13	8	Erysipelas	26	24	14	18	Erysipelas	26	24	16	15
13	Remittent Fever	33	25	12	13	Remittent Fever	32	23	14	13	Remittent Fever	33	24	14	14
14	Intermittent Fever	45	34	12	19	Scarlet Fever	18	11	14	12	Inflam. of Bowels	14	13	14	11
15	Scarlet Fever	18	13	9	16	Inflam. of Bowels	12	12	11	8	Scarlet Fever	18	12	13	10
16	Whooping-cough	16	10	8	7	Diphtheria	17	8	8	9	Measles	16	15	9	10
17	Typhoid Fev.(ent.)	9	7	7	6	Whooping-cough	16	12	8	9	Whooping-cough	16	12	8	7
18	Dysentery	7	7	5	7	Typhoid Fev.(ent.)	7	5	5	4	Diphtheria	15	7	8	6
19	Diphtheria	20	11	5	10	Measles	13	13	5	12	Typhoid Fev.(ent.)	5	4	4	3
20	Puerperal Fever	5	5	3	5	Puerperal Fever	5	5	3	4	Dysentery	7	7	4	7
21	Membran. Croup	9	6	3	2	Inflam. of Brain	6	5	3	3	Inflam. of Brain	6	5	3	3
22	Measles	10	9	2	10	Membran. Croup	8	6	2	5	Cholera morbus	5	3	3	3
23	Cholera morbus	4	3	2	4	Dysentery	6	6	2	5	Typho-mal. Fever	10	6	2	3
24	Inflam. of Brain	5	5	2	3	Cholera morbus	4	3	1	4	Cerebro-spi. men.	5	3	1	1
25	Cerebro-spi. men.	3	2	1	4	Typho-mal. Fever	11	6	1	2	Cholera infantum	2	1	1	1
26	Typho-mal. Fever	13	8	1	5	Cerebro-spi. men.	4	3	0.3	2	Membran. Croup	7	5	1	4
27	Cholera infantum	2	2	1	2	Cholera infantum	2	2	0	1	Puerperal Fever	6	5	1	3
28	Small-pox	1.2	0.5	0	1	Small-pox	1	0.6	0	2	Small-pox	0.6	0.1	1	0.2
	Reports received§	372	478	487	483	Reports received§	346	393	383	480	Reports received§	368	416	284	536

Line number.	April.* Diseases.	Av. '77-'93.	Av. '86-'93.	1894.	1893.	May.* Diseases.	Av. '77-'93.	Av. '86-'93.	1894.	1893.	June.* Diseases.	Av. '77-'93.	Av. '86-'93.	1894.	1893.
	Average Disease†.	28	25	20	20	Average Disease†.	28	23	19	19	Average Disease†.	25	22	18	18
1	Rheumatism	75	74	66	73	Rheumatism	71	72	67	67	Rheumatism	67	68	60	61
2	Neuralgia	71	70	61	61	Neuralgia	66	65	57	56	Neuralgia	63	61	51	50
3	Bronchitis	70	68	58	64	Bronchitis	61	60	49	54	Bronchitis	51	49	42	42
4	Influenza	53	55	55	48	Tonsillitis	47	48	44	49	Diarrhea	43	39	39	36
5	Tonsillitis	54	55	50	54	Consumption, Pul.	59	50	40	43	Consumption, Pul.	57	47	37	37
6	Consumption, Pul.	62	53	41	45	Influenza	39	40	38	40	Tonsillitis	40	38	30	37
7	Pneumonia	48	39	30	31	Diarrhea	35	33	27	28	Intermittent Fever	63	41	28	25
8	Diarrhea	31	30	26	29	Intermittent Fever	62	41	24	26	Influenza	27	26	21	21
9	Intermittent Fever	58	41	24	25	Pneumonia	36	30	24	20	Inflam. of Kidney	21	21	21	19
10	Inflam. of Kidney	24	24	21	22	Inflam. of Kidney	24	23	23	21	Remittent Fever	39	26	20	21
11	Pleuritis	...	23	19	17	Measles	23	19	19	17	Scarlet Fever	14	9	15	11
12	Remittent Fever	36	26	17	14	Erysipelas	25	23	16	17	Pneumonia	21	16	15	12
13	Scarlet Fever	18	12	17	12	Scarlet Fever	16	11	16	11	Cholera morbus	16	14	14	13
14	Measles	20	17	15	11	Pleuritis	...	19	14	13	Inflam. of Bowels	15	14	13	13
15	Erysipelas	27	26	14	18	Remittent Fever	38	26	14	19	Measles	19	16	13	13
16	Inflam. of Bowels	12	12	14	11	Inflam. of Bowels	13	14	12	8	Erysipelas	22	21	12	14
17	Whooping-cough	15	12	12	7	Whooping-cough	16	14	12	10	Whooping-cough	16	13	12	12
18	Inflam. of Brain	6	5	6	3	Cholera morbus	7	7	8	4	Pleuritis	...	14	11	11
19	Cholera morbus	5	4	6	4	Diphtheria	13	7	6	8	Cholera infantum	9	8	8	9
20	Diphtheria	15	7	6	6	Typhoid Fev.(ent.)	5	4	6	4	Dysentery	12	10	7	9
21	Dysentery	8	6	4	4	Dysentery	8	8	5	4	Diphtheria	11	6	7	9
22	Cerebro-spi. men.	5	3	3	1	Cholera infantum	3	3	4	1	Typhoid Fev.(ent.)	5	5	5	6
23	Cholera infantum	2	1	2	1	Inflam. of Brain	5	5	4	2	Inflam. of Brain	5	5	4	3
24	Typhoid Fev.(ent.)	5	3	2	3	Membran. Croup	4	4	3	2	Puerperal Fever	5	5	4	5
25	Membran. Croup	6	4	2	2	Puerperal Fever	5	5	2	4	Typho-mal. Fever	9	6	2	1
26	Puerperal Fever	5	6	1	5	Typho-mal. Fever	9	6	1	2	Membran. Croup	3	2	2	0.2
27	Small-pox	1	.06	1	0.2	Cerebro-spi. men.	5	3	1	2	Small-pox	1.2	.08	2	0.2
28	Typho-mal. Fever	10	7	1	3	Small-pox	1.4	.06	1	0	Cerebro-spi. men.	4	3	1	2
	Reports received§	322	352	369	406	Reports received§	368	414	528	529	Reports received§	367	423	453	442

*For 1894 the number of observers, reports, weeks in each month, etc., are stated in the first five columns of Exhibit III., page 90, the names of observers and the number of reports received from each are stated in Exhibit V., pages 94, 95 and 96.

Cent of the Reports Received the diseases stated to be Present in each of the years 1893 years, 1886–1893, and for the Period of seventeen years, 1877–1893.

What Per Cent of the Reports Received Stated Presence of the Disease.‡

July.* Diseases.	Av. '77-'93.	Av. '86-'93.	1894.	1893.	August.* Diseases.	Av. '77-'93.	Av. '86-'93.	1894.	1893.	September.* Diseases.	Av. '77-'93.	Av. '86-'93.	1894.	1893.	Line number.
Average Disease†.	27	23	18	18	Average Disease†.	29	26	20	21	Average Disease†.	30	25	22	21	
Rheumatism	61	61	58	60	Diarrhea	84	81	72	74	Diarrhea	78	76	71	75	1
Diarrhea	69	65	55	54	Rheumatism	58	59	54	58	Rheumatism	61	62	53	57	2
Neuralgia	59	59	51	51	Neuralgia	57	57	47	53	Neuralgia	59	58	52	54	3
Consumption, Pul.	45	45	39	35	Dysentery	50	44	38	34	Bronchitis	47	46	43	39	4
Bronchitis	43	42	32	35	Cholera infantum	44	41	38	34	Dysentery	45	42	40	41	5
Tonsillitis	33	33	32	37	Cholera morbus	54	50	38	43	Cholera morbus	38	36	37	28	6
Intermittent Fever	65	44	28	27	Bronchitis	41	40	36	34	Consumption, Pul.	54	45	37	37	7
Cholera morbus	42	36	27	24	Consumption, Pul	53	45	35	37	Cholera infantum	34	33	33	33	8
Cholera infantum	28	25	22	17	Tonsillitis	32	32	30	34	Tonsillitis	36	36	31	35	9
Remittent Fever	41	28	20	20	Intermittent Fever	66	46	28	32	Intermittent Fever	65	44	29	29	10
Dysentery	27	22	20	13	Remittent Fever	48	34	23	22	Remittent Fever	50	36	28	25	11
Influenza	19	17	15	14	Inflam. of Bowels	20	21	18	20	Typhoid Fev.(ent.)	19	18	23	16	12
Inflam. of Kidney	19	18	15	17	Influenza	19	17	18	16	Influenza	27	25	23	25	13
Inflam. of Bowels	17	17	13	13	Typhoid Fev.(ent.)	13	13	15	12	Inflam. of Bowels	17	17	15	16	14
Scarlet Fever	11	6	12	7	Whooping-cough	19	15	13	13	Scarlet Fever	10	7	14	7	15
Whooping-cough	19	15	12	11	Inflam. of Kidney	17	17	13	13	Erysipelas	16	15	13	9	16
Erysipelas	19	17	10	15	Scarlet Fever	9	6	11	7	Inflam. of Kidney	17	16	13	14	17
Pleuritis	---	11	10	11	Erysipelas	17	16	9	8	Whooping-cough	17	13	13	9	18
Pneumonia	14	10	9	8	Pneumonia	11	9	7	7	Pleuritis	---	11	11	9	19
Typhoid Fev.(ent.)	7	6	7	7	Diphtheria	12	6	7	8	Typho-mal. Fever	31	20	11	9	20
Measles	12	9	5	8	Pleuritis	---	9	7	7	Pneumonia	15	12	10	9	21
Diphtheria	11	6	4	7	Typho-mal. Fever	20	15	6	7	Diphtheria	12	7	8	6	22
Typho-mal. Fever	12	8	3	2	Inflam. of Brain	6	4	4	2	Inflam. of Brain	5	4	5	2	23
Puerperal Fever	4	4	2	4	Cerebro-spi. men.	4	3	3	1	Cerebro-spi. men.	4	3	2	2	24
Inflam. of Brain	5	5	2	2	Puerperal Fever	4	3	2	3	Puerperal Fever	4	4	1	3	25
Membran. Croup	2	1	1	1	Measles	6	4	2	3	Measles	4	3	1	2	26
Cerebro-spi. men.	4	3	1	2	Small-pox	0.4	0.1	0.5	0	Membran. Croup	3	2	0	.02	27
Small-pox	0.9	0.1	1	0	Membran. Croup	2	1	0.3	1	Small-pox	0.3	0.1	0	0	28
Reports received§	391	440	485	465	Reports received§	417	478	603	568	Reports received§	392	449	473	458	

October.* Diseases.	Av. '77-'93.	Av. '86-'93.	1894.	1893.	November.* Diseases.	Av. '77-'93.	Av. '86-'93.	1894.	1893.	December.* Diseases.	Av. '77-'93.	Av. '86-'93.	1894.	1893.	Line number.
Average Disease†.	28	24	20	20	Average Disease†.	27	23	19	20	Average Disease†.	27	24	19	20	
Rheumatism	66	67	58	64	Rheumatism	70	67	64	64	Rheumatism	72	70	64	65	1
Neuralgia	62	61	56	55	Neuralgia	66	64	57	60	Bronchitis	69	66	57	62	2
Bronchitis	54	54	52	48	Bronchitis	64	61	53	61	Neuralgia	68	68	52	57	3
Diarrhea	54	52	49	55	Tonsillitis	54	53	46	53	Influenza	52	56	51	93	4
Tonsillitis	45	45	40	44	Influenza	41	41	40	62	Tonsillitis	59	58	49	55	5
Consumption, Pul.	55	45	34	32	Consumption, Pul.	55	45	33	37	Consumption, Pul.	56	47	29	38	6
Influenza	32	31	29	29	Diarrhea	34	33	26	29	Pneumonia	40	33	27	34	7
Remittent Fever	48	34	28	24	Remittent Fever	40	29	23	21	Diarrhea	27	27	24	24	8
Intermittent Fever	53	43	27	28	Intermittent Fever	56	38	21	26	Remittent Fever	35	25	21	12	9
Typhoid Fev.(ent.)	21	20	24	23	Pneumonia	30	24	21	24	Intermittent Fever	49	32	20	17	10
Dysentery	23	21	20	25	Inflam. of Kidney	20	19	18	15	Scarlet Fever	15	11	17	12	11
Scarlet Fever	14	11	17	10	Scarlet Fever	15	11	17	11	Inflam. of Kidney	20	19	15	12	12
Inflam. of Kidney	19	18	14	14	Typhoid Fev.(ent.)	19	16	17	20	Whooping-cough	15	10	14	8	13
Cholera morbus	15	13	13	13	Pleuritis	---	17	15	12	Erysipelas	23	21	14	15	14
Pneumonia	19	16	13	12	Whooping-cough	15	10	14	7	Typhoid Fev.(ent.)	13	11	13	8	15
Whooping-cough	15	10	13	7	Erysipelas	21	19	13	12	Pleuritis	---	22	13	22	16
Cholera infantum	12	11	13	15	Diphtheria	21	11	11	8	Diphtheria	20	10	12	6	17
Pleuritis	---	14	12	10	Inflam. of Bowels	13	12	11	10	Inflam. of Bowels	14	13	8	9	18
Inflam. of Bowels	14	14	11	14	Dysentery	11	10	9	9	Typho-mal. Fever	16	9	5	4	19
Erysipelas	20	18	10	11	Typho-mal. Fever	24	14	7	8	Puerperal Fever	4	4	5	1	20
Diphtheria	19	11	9	6	Cholera morbus	6	5	5	5	Dysentery	7	6	4	2	21
Typho-mal. Fever	33	20	8	8	Membran. Croup	7	5	4	3	Cholera morbus	5	4	4	3	22
Membran. Croup	5	4	4	1	Puerperal Fever	4	3	3	3	Inflam. of Brain	5	5	2	2	23
Inflam. of Brain	5	4	3	4	Inflam. of Brain	4	4	2	2	Membran. Croup	8	6	2	2	24
Puerperal Fever	4	4	2	2	Cholera infantum	4	3	2	2	Measles	7	6	2	2	25
Cerebro-spi. men.	3	2	1	1	Cerebro-spi. men.	3	2	1	1	Cholera infantum	2	2	1	1	26
Small-pox	0.3	0.1	1	0	Measles	5	4	1	2	Cerebro-spi. men.	3	2	0.5	2	27
Measles	4	3	0.4	1	Small-pox	0.5	0.2	1	0	Small-pox	0.6	0.3	0	0	28
Reports received§	404	454	541	459	Reports received§	390	457	446	576	Reports received§	390	433	425	451	

†The numbers in this line are an average, not for all diseases represented, but only for those reported present in the given month. ‡See foot-note with this mark on a subsequent page.
§The numbers in this line state how many reports were received for the month in the given year.
*†‡These notes on page 91.

EXHIBIT V.—*By Months and by Geographical Divisions of the State,* the Names of 189 Observers, whose Weekly Reports of Diseases for 1894 are Compiled in Tables 1, 2, 3 and 4, the Localities[a] for which they Report, and the Number of Reports Received from each Observer.*

Divisions and localites represented and physicians who reported. (Health Officers in Italics.)	Weekly Reports in 1894.—Compiled in this Article.												
	Year 1894.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
All localities	5,572	487	383	384	369	523	453	485	603	473	541	446	425
Upper Peninsular Division*	435	40	31	33	29	43	37	33	42	35	46	34	32
Calumet, Charles W. Niles, M. D.	17									4	5	4	4
Escanaba, *O E. Youngquist, M. D.*	24	5	4	4	4	5	2						
Houghton, *H. W. Jones, M D.*	31			3	3	3	3		4	2	5	4	4
Iron Mountain, *C. F. Larson, M. D.*	17	5	4	4	4								
Iron Mountain, *J. F. Menustrina, M. D.*	26							4	5	4	5	4	4
Ironwood, *F. M. McCabe, M. D.*	33					3	4	4	5	4	5	4	4
Ishpeming, *G. G. Barnett, M. D.*	47	5	4	4	4	5	4	4	3	3	3	4	4
Lake Linden, *J. M. P. Pichette, M. D.*	20	5	4	4	4	3							
Lake Linden, *Geo. W. Orr, M. D.*	25					5	4	4	5	4	3		
Menominee, *Walter S. Hicks, M. D.*	30						4	4	5	4	5	4	4
Nanbinway, *Theo. Grenier, M. D.*	24	5	4	4	4	5	2						
Newberry, *F. W. Neal, M. D.*	18								5	4	5	2	2
Norway *J. B. Brasseuer, M. D.*	22						4	4	5	2	3	4	
Richmond, *H. W. Haskell, M. D.*	31	5	4	4	4	5	4	2			3		
Rockland, *W. C. Gates, M. D.*	25	5	3	4	2	4	2	3					2
Sault Ste. Marie, *C. J. Ennis, M. D*	34					5	4	4	5	4	4	4	4
Wakefield, *J. H. Eddy, M. D.*	11	5	4	2									
Northwestern Division*	208	9	9	8	9	22	16	25	32	21	23	19	15
Cadillac, *David Ralston, M. D.*	16							3	4	2	4	3	
Copemish, *S. H. Cornell, M. D.*	44		2	4	3	5	4	4	5	4	5	4	4
Fife Lake, *Lewis S. Walter, M, D.*	46	5	4	4	4	5		4	5	4	4	4	2
Frankfort, *Hudson J. Kinne, M. D.*	34					4	4	4	5	4	5	4	4
Lake Ann, *Geo. K. Shirton, M. D.*	7	4	3										
Manistee, *D. E. Robinson, M. D.*	36				2	5	3	4	5	4	5	4	4
Sherman, *W. J. Bruce, M. D.*	13					3	3	4	3				
South Frankfort, *D. W. Roos, M. D.*	12						2	2	5	3			
Northern Division*	240	20	15	20	15	23	21	20	27	22	26	16	15
Bellaire, *C. V. Hinman, M. D.*	33					4	4	4	5	4	3	4	3
Boyne City, *Chas. Deuell*	13	5	4	4									
Cheboygan, *W. F. Reed, M. D.*	46		3	4	4	5	4	4	5	4	5	4	4
East Jordan, *Frank A. Foster, M. D.*	25							4	4	4	5	4	4
Gaylord, *N. L. Parmenter, M. D.*	10				3	4	3						
Kalkaska, *S. A. Johnson, M. D.*	13	5	4	4									
Kalkaska, *E. S. Trask, M. D.*	36				2	5	4	4	5	3	5	4	4
Mackinaw City, *J. J. Reycraft, M. D.*	25	5	2	4	3		2		3	3	3		
Petoskey, *Arthur G. Oven, M. D.*	39	5	2	4	3	5	4	4	5	4	3		
Northeastern Divison*	109	10	8	8	8	13	7	8	10	11	10	8	8
Alpena, *James Eakins, M. D.*	36				2	4	4	4	5	4	5	4	4
Harrisville, *D. W. Mitchell, M. D.*	51	5	4	4	4	5	3	4	5	4	5	4	4
Tawas City, *G. S. Darling, M. D.*	15	5	4	4	2								
Tawas City, *M. J. Conant, M. D.*	7					4				3			
Northern Central Division*	199	10	12	9	0	14	22	23	27	18	25	19	20
Big Rapids, *W. E. Dockry, M. D.*	29						4	4	4	4	5	4	4
Clare, *Joseph H Carpenter, M. D.*	11	5	4	2									
Farwell, *L. L Kelly, M. D.*	32					5	3	3	5	3	5	4	4
Gladwin, *J. W. Leinenger, M. D.*	29						3	4	5	4	5	4	4
Lake City, *D. J. Erwin, M. D.*	16					5	4	4	3				
McBain, *S. D. Yerington, M. D.*	46	5	4	3		4	4	4	5	4	5	4	4
Mt Plessant, *C. D. Pullen, M. D.*	17								2	3	5	3	4
Roscommon, *James A. Fraser, M. D.*	19		4	4			4	4	3				
Western Division*	526	43	30	36	34	37	41	47	61	47	57	49	44
Caledonia, *A. G. Graybiel, M. D.*	29						4	4	5	4	5	4	3
Cannonsburg, C. R. Crosby, M. D.	43	5	4	4	4		4	2	5	4	4	4	3
Casnovia, *T. M. Koon, M. D.*	6							4		2			
Cedar Springs, *L. Swanton, M. D.*	18							3	3		4	4	4
Grand Haven, *Wm F. Reus, M. D.*	32					3	4	3	5	4	5	4	4
Grand Rapids, A. Hazelwood, M. D.	51	5	4	4	4	5	3	4	5	4	5	4	4
Lowell, *Otto C. McDannell, M. D.*	34	5	4	4	4	5	4	4	4				
Ludington, *A. P. McConnell, M. D.*	34					5	4	3	5	4	5	4	4

[a] In many cases the reports include sickness in the vicinity as well as the corporate limits of the places named.

* For counties in each division see Exhibit I., page 87.

EXHIBIT V.—CONTINUED.

s and localities represented hysicians who reported. Ith Officers in Italics.)	Weekly Reports in 1894.—Compiled in this Article.													
	Year, 1894.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	
ision.—Con.														
arl Fairbanks, M. D.	44	4	...	4	4	4	3	4	5	3	5	4	4	
, Geo. L. LeFevre, M. D.	17	5	4	4	4	...	...	...	...	...	...	...	...	
gon, Perly W. Pearsall, M. D.	51	5	4	4	4	5	4	3	5	4	5	4	4	
, Hollis O. Sarber, M. D.	17	...	...	...	...	...	...	...	...	4	5	4	4	
s, A. R. Hicks, M. D.	33	4	3	4	3	...	4	3	5	4	4	3	4	
, W. C. Martin, M. D.	23	...	...	...	...	...	...	4	5	3	5	3	3	
nd, W. A. Kuhn, M. D.	52	5	4	4	4	5	4	4	5	4	5	4	4	
, John Busby, M. D.	38	5	4	4	4	5	3	3	4	3	...	3	...	
sion *	986	96	70	70	64	99	81	80	105	84	88	77	72	
V. Brainard, M. D.	26	4	3	4	4	4	4	3	4	3	...	2	...	
P. Suydam, M. D.	35	...	...	...	...	5	4	4	5	4	5	4	4	
P. B. Meloche, M. D.	13	...	...	...	...	...	4	4	5	...	...	...	...	
, P. B. Patterson, M. D.	11	4	3	4	...	...	...	...	...	...	...	...	...	
H. J. Emery, M. D.	24	...	...	...	...	4	3	2	4	4	5	3	4	
Frank S. Love, M. D.	17	5	4	4	4	...	...	...	...	...	...	...	...	
, A. Titus, M. D.	6	...	...	...	...	...	...	2	...	...	...	2	2	
ih Bates, M. D.	39	...	...	...	...	4	5	4	4	5	4	5	4	4
, C. O Jenison, M. D.	13	5	4	4	...	...	...	...	...	...	...	...	...	
, J. N. Swartz, M. D.	50	5	4	4	4	5	4	4	4	3	5	4	4	
G. W. Lowry, M. D.	13	5	4	4	...	...	...	...	...	...	...	...	...	
W. C. Woodmansee, M. D.	29	...	...	...	...	4	3	2	4	3	5	4	4	
Logan, M. D.	33	...	...	...	...	5	4	4	5	4	5	4	3	
, A. H. Forsyth, M. D.	50	5	4	4	4	5	4	3	4	4	5	4	4	
M. Hutchinson, M. D.	49	5	2	4	4	4	4	4	5	4	5	4	4	
pids, G. C. Young, M. D.	35	...	...	...	...	5	4	4	5	4	5	4	4	
le, Geo. W. Matteson, M. D.	37	...	...	...	3	5	3	4	5	4	5	4	4	
s, H. W. Graham, M. D.	48	5	4	4	3	4	4	4	4	4	5	3	4	
W. H. Young, M. D.	16	5	4	4	3	...	...	...	...	...	...	...	...	
es E. Taylor, M. D.	52	5	4	4	4	5	4	4	5	4	5	4	4	
W. Cobb, M. D.	51	5	4	4	4	5	4	4	5	4	5	4	3	
, G. Burton Wade, M. D.	26	5	3	3	3	4	...	...	4	4	3	4	3	
e. E. R. Espie, M. D.	49	5	3	4	4	5	4	2	5	4	5	4	4	
Robert W. Alton, M. D.	35	...	...	...	2	5	4	2	5	4	5	4	4	
Charles Wunch, M. D.	12	5	4	3	...	...	...	...	...	...	...	...	...	
R. H. Blaisdell, M. D.	48	5	4	...	4	5	4	4	5	4	5	4	4	
W. P. Gamber, M. D.	52	5	4	4	4	5	4	4	5	4	5	4	4	
Allen L. Corey, M. D.	12	3	...	2	...	...	...	...	2	3	...	2	...	
John J. Travis, M. D.	25	...	...	...	4	5	3	4	5	4	...	...	...	
V. H. Holtzman, M. D.	17	...	...	...	...	...	2	4	5	4	...	...	2	
ille, Wm. Parmenter, M. D.	15	5	4	4	2	...	...	...	...	...	...	...	...	
l, D. B. Kilpatrick, M. D.	11	5	4	3	...	...	...	...	...	...	...	...	...	
l, L. E. Benson, M. D.	12	...	...	...	...	5	3	4	...	...	...	...	...	
ern Division *	776	70	60	55	49	73	64	74	76	66	74	56	59	
J. Delbridge, M. D.	37	...	...	...	3	5	4	4	5	4	5	4	3	
), H. Burley, M. D.	27	...	...	...	...	...	4	4	4	4	4	4	3	
mes R. McGurk, M. D.	29	5	4	4	4	5	4	3	...	...	...	...	...	
J. M. Truscott, M. D.	13	5	4	4	...	...	...	...	...	...	...	...	...	
N. McClinton, M. D.	20	...	...	...	4	5	3	4	...	...	...	2	2	
le, H. W. Smith, M. D.	6	...	...	...	2	...	...	4	...	...	...	...	...	
, D. W. Mudge, M. D.	50	5	4	3	4	5	4	4	5	4	5	3	4	
T. S. Kingston, M. D.	52	5	4	4	4	5	4	4	5	4	5	4	4	
ville, C. A. Wisner, M. D.	30	5	4	4	...	...	...	...	...	4	5	4	4	
ville, Edwin Conly, M. D.	26	...	...	...	...	5	...	...	4	4	5	4	4	
le, George C. Vincent, M. D.	48	5	4	4	4	5	4	4	5	4	5	...	4	
, Harry J. Garber, M. D.	34	5	4	3	4	5	4	4	5	...	...	...	...	
Benj. D'Arcy, M. D.	9	5	...	4	...	...	...	...	...	...	...	...	...	
B. C. Bradshaw, M. D.	20	...	...	...	...	5	2	4	5	4	...	...	...	
ty, C. W. Shaver, M. D.	30	...	...	...	...	3	3	3	5	4	5	3	4	
, G. W. Stover, M. D.	52	5	4	4	4	5	4	4	5	4	5	4	4	
in, Sarah A. Cole, M. D.	52	5	4	4	4	5	4	4	5	4	5	4	4	
isc, G. D. Soper, M. D.	14	4	4	4	...	...	...	...	...	3	...	...	...	
m. C. Edson Covey, M. D.	43	4	4	3	3	3	3	4	5	4	5	4	4	
(W. S.) E. E. Curtis, M. D.	34	...	...	...	...	4	4	4	5	4	5	4	4	
(E. S.) S. E. Campbell, M. D.	14	4	4	3	3	...	...	...	...	...	...	...	...	
Wm. E. Burtless, M. D.	10	...	...	...	...	...	3	4	3	...	...	...	...	
, J. S. Caulkins, M. D.	51	5	4	4	4	5	4	4	5	4	5	4	3	
e, J. Wood, M. D.	42	3	4	...	2	3	4	4	5	4	5	4	4	
hn C. Avery, M. D.	7	...	4	3	...	...	...	...	...	...	...	...	...	
H. Gowan, M. D.	23	...	...	...	...	...	2	4	...	4	5	4	4	
a Division *	561	55	39	39	38	54	48	51	59	41	48	48	41	
s C. Harrison, M. D.	15	5	4	4	2	...	...	...	...	...	...	...	...	

s in each division see Exhibit I., page 87.

EXHIBIT V.—Concluded.

Divisions and localities represented and physicians who reported. (Health Officers in Italics.)	Weekly Reports in 1894.—Compiled in this Article.												
	Year, 1894.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Southwestern Division.—Con.													
Bangor, *Joel Camp, M. D.*	26	----	----	----	----	5	3	4	4	3	----	4	3
Berrien Springs, *W. F. Bullard, M. D.*	30	----	----	----	----	----	4	4	5	4	5	4	4
Benton Harbor, *Wakeman Ryno, M. D.*	15	4	3	4	4	----	----	----	----	----	----	----	----
Benton Harbor. *F. A. Votey, M. D.*	20	----	----	----	----	4	----	----	5	2	5	2	2
Bloomingdale, *W. A. Mumbrue, M. D.*	31	----	----	----	3	5	4	4	----	3	4	4	4
Cassopolis. *T. W. Anderson, M. D.*	15	----	----	----	----	----	3	4	----	----	4	4	----
Douglas, *Harley A. Stroud, M. D.*	32	4	4	4	4	5	4	3	4	----	----	----	----
Dowagiac, *J. H. Jones, M. D.*	11	----	----	----	----	----	4	4	3	----	----	----	----
Fennville, *W. H. Andrews, M. D.*	38	4	4	2	3	5	3	4	4	3	----	3	3
Hartford, *H. C. Maynard, M. D.*	25	5	----	----	----	----	----	----	4	3	5	4	4
Lawrence, *O. B. Wiggins, M. D.*	12	5	3	3	----	----	----	----	----	----	----	----	----
Marcellus, *Fred Shilleto, M. D.*	48	5	3	3	4	5	4	4	5	3	----	4	3
Niles, *J. D. Greenamyer, M. D.*	52	5	4	4	4	5	4	4	5	4	5	4	4
Otsego, *Milton Chase, M. D.*	48	3	2	4	4	5	4	4	5	4	5	4	4
Saugatuck, *H. M. Stimson, M. D.*	52	5	4	4	4	5	4	4	5	4	5	4	4
South Haven, *W. B. Anderson, M. D.*	13	5	4	4	----	----	----	----	----	----	----	----	----
South Haven, *W. G. Triece, M. D.*	34	----	----	----	2	5	3	4	5	4	5	4	2
Watervliet, *W. L. Garrett, M. D.*	50	5	4	3	4	5	4	4	5	4	5	3	4
Southern Central Division.....*	1074	100	84	79	91	103	79	84	107	83	97	85	82
Albion, *A. M. Haight, M. D.*	17	----	----	----	----	----	----	----	----	4	5	4	4
Augusta, *C. E. Doyle, M. D.*	39	----	----	----	4	5	4	4	5	4	5	4	4
Bronson, *S. M. Cornell, M. D.*	38	----	----	----	3	5	4	4	5	4	5	4	4
Brooklyn, *E. N. Palmer, M. D.*	41	4	2	4	4	3	2	2	3	4	5	4	4
Burr Oak Tp., *J. C. Rollman, M. D.*	52	5	4	4	4	5	4	4	5	4	5	4	4
Burr Oak, *C. D. Parsons, M. D.*	48	5	4	4	3	4	2	4	5	4	5	4	4
Clayton, *James McDonald, M. D.*	15	5	4	4	2	----	----	----	----	----	----	----	----
Clayton, *E. J. C. Ellis, M. D.*	15	----	----	----	----	----	2	2	3	3	----	2	3
Clinton, *John E. White, M. D.*	38	----	----	----	----	4	4	4	4	4	5	4	4
Coldwater, *W. L. Ford, M. D.*	39	----	----	----	4	5	4	4	5	4	5	4	4
Concord, *W. N. Keeler, M. D.*	52	5	4	4	4	5	4	4	5	4	5	4	4
Deerfield, *Webster Bliss, M. D.*	15	5	4	4	2	----	----	----	----	----	----	----	----
Galesburg, *O. F. Burroughs, M. D.*	36	----	2	4	4	3	----	4	5	4	3	3	4
Kalamazoo, *A. Hockstein, M. D.*	52	5	4	4	4	5	4	4	5	4	5	4	4
Kalamazoo, H. H. Schayberg, M. D.	15	4	4	----	4	3	----	----	----	----	----	----	----
Kalamazoo, W. B. Southard, M. D.	25	5	4	4	4	5	3	----	----	----	----	----	----
Kalamazoo, J. H. McKibbin, M. D.	10	----	----	----	----	----	2	4	4	----	----	----	----
Litchfield, *Amos Atkinson, M. D.*	34	----	----	----	2	5	4	4	5	2	4	4	4
Marshall, *Isaac W. Houston, M. D.*	14	----	----	----	----	3	3	2	3	----	----	3	----
Marshall, *L. S. Joy, M. D.*	17	5	4	4	4	----	----	----	----	----	----	----	----
Manchester, *E. M. Conklin, M. D.*	15	5	4	4	2	----	----	----	----	----	----	----	----
Mendon, *H. C. Clapp, M. D.*	48	3	4	4	4	5	3	4	5	4	5	3	4
Mendon, *Edwin Stewart, M. D.*	49	5	4	4	4	5	4	4	5	3	3	4	4
Richland, *J. M. Rankin, M. D.*	49	5	4	4	4	5	4	4	5	3	5	4	2
Springport, *J. B. Judson, M. D.*	12	5	4	3	----	----	----	----	----	----	----	----	----
Sherwood, *C. E. Nelthorpe, M. D.*	9	5	4	----	----	----	----	----	----	----	----	----	----
Sturgis, *S. B. Follett, M. D.*	44	5	4	4	4	5	4	4	5	4	----	3	2
Tecumseh, J. F. Jenkins, M. D.	50	5	4	4	4	5	4	4	5	4	4	4	3
Tecumseh, *T. O. Tefft, M. D.*	49	4	4	4	3	5	4	4	5	4	5	3	4
Tekonsha, *John L. Ramsdell, M. D.*	52	5	4	4	4	5	4	4	5	4	5	4	4
Three Rivers, *A. H. Scidmore, M. D.*	8	----	----	----	2	3	----	----	----	----	3	----	----
Union City, *E. Hurd M. D.*	18	----	----	----	4	5	4	----	----	----	----	----	----
Vicksburg, *C. H. McKain, M. D.*	41	5	4	4	4	----	----	2	5	4	5	4	4
Ypsilanti, *F. K. Owen, M. D.*	28	----	----	----	----	----	2	4	5	4	5	4	4
Southeastern Division.....*	459	34	25	27	32	42	37	40	57	45	47	35	37
Armada, *G. W. Shipman, M. D.*	35	----	----	----	2	5	3	4	5	4	4	4	4
Highland Park, *A. Stewart, M. D.*	52	5	4	4	4	5	4	4	5	4	5	4	4
Memphis, *A. B. House, M. D.*	14	5	3	4	2	----	----	----	----	----	----	----	----
Memphis, *George P. Hale, M. D.*	20	----	----	----	----	----	3	4	5	3	3	----	2
Mt. Clemens, *Edward G. Folsom, M. D.*	21	----	----	----	----	----	----	----	4	4	5	4	4
New Haven, *Alex. Gunn, M. D.*	52	5	4	4	4	5	4	4	5	4	5	4	4
Plymouth, *J. M. Collier, M. D.*	13	----	----	----	----	5	3	----	3	2	----	----	----
Richmond, *E. B. Keeler, M. D.*	32	----	----	----	2	2	2	4	5	4	5	4	4
Romeo, *J. B. Fares, M. D.*	18	5	4	4	----	----	----	----	----	----	----	----	----
Romeo, *John Greenshields, M. D.*	37	----	----	----	2	5	4	4	5	4	5	4	4
Rochester, *Jesse E. Wilson, M. D.*	16	----	----	----	----	----	3	4	5	4	----	----	----
South Lyon, *L. A. Sayles, M. D.*	38	----	----	----	4	5	4	4	5	4	5	4	3
Trenton, *Hiram Holden, M. D.*	52	5	4	4	4	5	4	4	5	4	5	4	4
Warren, *J. C. Flynn, M. D.*	49	5	3	3	4	5	3	4	5	4	5	3	4
Wayne, *H. E. Foster, M. D.*	15	4	3	4	4	----	----	----	----	----	----	----	----

* For counties in each division see Exhibit I., page 87.

TABLE 1.—*Stating, for each of the Thirteen Years, 1882–1894, and the Average for 1877–1893, also the Average for the period of eight years, 1886–1893, by what Per Cent of Observers each of 28 Diseases was reported present in those years (also the Average Number of Observers per Month and the Total Observers for each Year).—Compiled from Weekly Reports of Health Officers of Cities and Villages and from Regular Correspondents of the State Board of Health.*—Diseases arranged in order of Greatest Number of Observers reporting them present in 1894.—(Continued for each month of 1893 and 1894, on pages 98–99.)*

Line Number.	Diseases.	Observers by whom the Several Diseases were Reported Present.—Average Per Cents (per Month) of those making Reports.†														
		Av. 1877–93.	Av. 1886–93.	1894	1893.	1892.	1891.	1890.	1889.	1888.	1887.	1886.	1885.	1884.	1883.	1882.
	Av. for tabulated diseases reported pres.	39	35	30	31	33	37	37	36	35	37	37	38	42	43	43
1	Rheumatism	83	83	78	80	83	86	87	82	82	82	85	83	83	83	85
2	Neuralgia‡	81	81	74	76	80	83	85	82	79	83	83	83	84	85	85
3	Bronchitis	74	74	67	72	73	75	81	75	74	69	71	70	74	79	80
4	Tonsillitis‡	70	71	64	71	71	74	75	71	64	68	70	72	73	73	72
5	Diarrhea	64	64	58	61	63	67	68	65	60	65	64	66	71	67	69
6	Influenza	54	55	55	57	56	69	67	49	46	46	48	47	53	56	55
7	Consumption, Pul.‡	65	57	43	47	49	60	62	59	57	60	64	68	72	71	74
8	Intermittent Fever	71	56	36	37	43	52	58	61	59	64	71	73	79	82	83
9	Pneumonia	58	46	36	37	43	40	50	47	49	46	48	44	48	59	61
10	Inflam. of Kidney‡	35	34	31	29	36	36	36	35	33	32	35	34	41	----	----
11	Remittent Fever	53	42	31	28	34	43	40	45	49	46	48	52	60	57	64
12	Pleuritis‡	----	33	28	27	35	36	35	33	32	----	----	----	----	----	----
13	Dysentery	31	30	27	25	29	30	31	33	30	33	30	28	38	35	31
14	Cholera Morbus	31	29	27	26	29	31	29	27	29	33	29	33	37	32	31
15	Inflam. of Bowels‡	29	30	27	25	28	31	29	29	30	32	32	32	30	31	28
16	Erysipelas	41	40	27	29	34	39	43	43	44	44	43	44	48	47	42
17	Scarlet Fever	25	18	24	19	22	17	18	18	17	15	20	22	29	32	32
18	Cholera Infantum	22	22	20	18	21	23	21	21	20	24	25	21	26	24	22
19	Whooping-cough	27	20	18	15	18	16	17	25	16	24	28	21	29	23	26
20	Typhoid Fever (Ent.)	18	15	18	15	15	16	14	17	16	15	15	16	20	19	24
21	Diphtheria	27	16	13	13	15	13	16	12	14	18	24	27	27	31	43
22	Measles	19	16	11	14	7	17	22	12	25	22	10	9	17	37	20
23	Inflam. of Brain‡	12	12	9	8	9	11	12	13	13	15	13	14	14	12	12
24	Typho-mal. Fever‡	27	19	8	9	10	12	14	26	25	26	27	27	32	32	39
25	Puerperal Fever	11	11	6	9	11	8	9	13	12	14	12	13	16	15	18
26	Membranous Croup	12	9	5	5	8	10	11	7	10	10	12	10	14	14	15
27	Cerebro-spinal Men.	8	7	4	5	5	6	8	7	7	7	8	12	12	11	12
28	Small-pox	1.2	0.2	1	0.3	.08	0	0.2	0.5	.07	.01	0.5	0.4	0.2	1	5
	No. of Observers	145	164	189	205	199	145	155	139	142	155	169	163	142	140	159
	Av. No. of Observers per month	91	105	116	113	109	91	102	100	102	114	113	104	79	88	93

* For 1894 the number of observers, reports, weeks in each month, etc., are stated in the first five columns of Exhibit III., page 90, the names of the observers and the number of the reports received from each are stated in Exhibit V., pages 94, 95 and 96.

†‡ Foot-notes are on page 103.

TABLE I.—CONTINUED.—*Per Cent of Observers by whom the Several Diseases were for the Period of eight years, 1886–1893, and*

Per Cent of Observers by whom the Diseases were Reported Present.‡

Line number.	January.* Diseases.	Av. '77–'93.	Av. '86–'93.	1894.	1893.
	Average †	40	36	30	31
1	Influenza	72	73	98	72
2	Rheumatism	87	86	82	83
3	Neuralgia	84	84	80	75
4	Bronchitis	84	82	78	79
5	Tonsillitis	80	80	77	85
6	Pneumonia	86	71	59	57
7	Consumption, Pul.	67	60	48	41
8	Diarrhea	47	49	41	52
9	Pleuritis	...	45	39	33
10	Inflam. of Kidney	35	33	33	32
11	Erysipelas	46	43	30	33
12	Inflam. of Bowels	26	26	30	18
13	Intermittent Fever	68	49	21	30
14	Scarlet Fever	32	24	20	28
15	Remittent Fever	47	36	18	18
16	Whooping-cough	27	18	15	15
17	Dysentery	15	15	15	15
18	Typhoid Fev. (ent.)	16	11	12	10
19	Puerperal Fever	12	12	11	12
20	Cholera morbus	9	8	9	10
21	Membran. Croup	20	14	9	6
22	Diphtheria	34	20	9	18
23	Measles	17	16	6	18
24	Inflam. of Brain	12	12	5	8
25	Cerebro-spi. men.	7	7	3	10
26	Cholera infantum	5	4	3	6
27	Typho-mal. Fever	23	15	2	9
28	Small-pox	2	0.6	0	2
	Observers §	88	100	102	126

Line number.	February.* Diseases.	Av. '77–'93.	Av. '86–'93.	1894.	1893.
	Average †	38	35	27	30
1	Influenza	74	76	87	74
2	Rheumatism	85	84	80	82
3	Neuralgia	84	84	80	79
4	Bronchitis	86	85	71	83
5	Tonsillitis	78	78	69	77
6	Pneumonia	87	72	54	54
7	Consumption, Pul.	67	60	39	48
8	Diarrhea	45	47	36	47
9	Inflam. of Kidney	38	37	35	32
10	Erysipelas	44	43	3	35
11	Pleuritis	...	44	30	35
12	Intermittent Fever	62	48	2	24
13	Remittent Fever	49	34	21	19
14	Scarlet Fever	29	19	21	20
15	Inflam. of Bowels	25	25	20	19
16	Diphtheria	29	16	14	15
17	Whooping-cough	26	18	1	15
18	Measles	20	20	10	28
19	Puerperal Fever	11	11	8	9
20	Typhoid Fev. (ent.)	12	8	7	6
21	Inflam. of Brain	13	13	7	18
22	Membran. Croup	17	13	5	11
23	Dysentery	12	13	4	10
24	Cholera morbus	10	8	3	11
25	Typho-mal. Fever	19	12	2	3
26	Cerebro-spi. men.	9	8	1	6
27	Cholera infantum	4	4	0	4
28	Small-pox	1.5	0.6	0	2
	Observers §	89	10	103	124

Line number.	March.* Diseases.	Av. '77–'93.	Av. '86–'93.	1894.	1893.
	Average †	40	37	29	32
1	Rheumatism	86	86	79	87
2	Influenza	75	80	79	78
3	Neuralgia	87	87	78	88
4	Bronchitis	86	84	76	88
5	Tonsillitis	80	81	71	84
6	Pneumonia	84	68	49	33
7	Diarrhea	49	50	42	44
8	Consumption, Pul.	69	62	41	52
9	Inflam. of Kidney	39	38	38	37
10	Erysipelas	46	46	34	33
11	Intermittent Fever	65	50	34	32
12	Pleuritis	...	44	32	42
13	Inflam. of Bowels	28	27	27	27
14	Scarlet Fever	32	22	22	23
15	Remittent Fever	46	36	20	22
16	Whooping-cough	26	19	17	11
17	Measles	26	24	15	21
18	Diphtheria	27	15	12	10
19	Inflam. of Brain	14	14	10	8
20	Dysentery	15	15	9	17
21	Cholera morbus	12	10	8	15
22	Typhoid Fev. (ent.)	10	7	7	7
23	Typho-mal. Fever	17	11	4	4
24	Cerebro-spi. men.	10	9	3	3
25	Cholera infantum	4	3	3	3
26	Puerperal Fever	14	13	3	9
27	Membran. Croup	15	12	2	10
28	Small-pox	1	0.4	2	1
	Observers §	86	97	102	115

Line number.	April.* Diseases.	Av. '77–'93.	Av. '86–'93.	1894.	1893.
	Average †	39	36	30	30
1	Neuralgia	86	85	79	82
2	Bronchitis	83	82	77	83
3	Rheumatism	88	88	76	85
4	Tonsillitis	76	77	71	75
5	Influenza	67	70	66	66
6	Diarrhea	50	49	48	50
7	Consumption, Pul.	70	63	48	56
8	Pneumonia	80	64	46	48
9	Pleuritis	...	42	34	30
10	Intermittent Fever	70	55	34	36
11	Inflam. of Kidney	40	39	33	34
12	Erysipelas	46	45	29	37
13	Remittent Fever	49	38	28	20
14	Inflam. of Bowels	25	24	27	22
15	Measles	31	28	26	20
16	Scarlet Fever	20	22	23	20
17	Whooping-cough	27	21	17	15
18	Inflam. of Brain	14	12	12	8
19	Cholera morbus	12	10	11	8
20	Diphtheria	26	14	10	11
21	Dysentery	15	13	10	8
22	Cerebro-spi. men.	10	7	7	3
23	Cholera infantum	4	4	6	4
24	Membran. Croup	13	11	6	6
25	Typhoid Fev. (ent.)	9	6	6	4
26	Puerperal Fever	12	14	5	10
27	Typho-mal. Fever	17	13	3	6
28	Small-pox	2	0.3	2	1
	Observers §	81	91	107	114

Line number.	May.* Diseases.	Av. '77–'93.	Av. '86–'93.	1894.	1893.
	Average †	38	36	31	32
1	Rheumatism	86	86	82	85
2	Neuralgia	82	83	75	78
3	Tonsillitis	72	72	78	75
4	Bronchitis	78	77	67	82
5	Influenza	56	57	57	58
6	Consumption, Pul.	69	61	48	56
7	Diarrhea	55	54	48	56
8	Pneumonia	68	53	46	42
9	Inflam. of Kidney	39	39	39	39
10	Intermittent Fever	74	57	37	45
11	Erysipelas	46	44	36	41
12	Pleuritis	...	34	33	28
13	Measles	35	31	32	33
14	Inflam. of Bowels	28	29	32	23
15	Scarlet Fever	27	20	27	25
16	Remittent Fever	52	40	23	34
17	Whooping-cough	29	22	21	18
18	Cholera morbus	18	17	18	14
19	Diphtheria	23	15	15	17
20	Typhoid Fev. (ent.)	8	6	13	8
21	Cholera infantum	8	8	12	6
22	Inflam. of Brain	13	12	12	7
23	Dysentery	17	18	12	11
24	Membran. Croup	10	8	8	5
25	Puerperal Fever	12	12	5	10
26	Cerebro-spi. men.	9	8	3	7
27	Typho-mal. Fever	17	13	3	4
28	Small-pox	2	0.3	2	0
	Observers §	89	102	114	115

	June.* Diseases.	Av. '77–'93.	Av. '86–'93.	1894.	1893.
	Average †	37	34	27	28
1	Rheumatism	84	84	76	78
2	Neuralgia	79	78	68	67
3	Bronchitis	69	69	59	63
4	Diarrhea	64	64	59	57
5	Tonsillitis	64	64	53	59
6	Consumption, Pul.	64	57	45	43
7	Intermittent Fever	74	57	37	39
8	Influenza	40	41	33	34
9	Inflam. of Kidney	37	38	31	32
10	Remittent Fever	52	40	29	34
11	Cholera morbus	36	31	27	29
12	Inflam. of Bowels	29	29	26	27
13	Pneumonia	45	33	25	24
14	Scarlet Fever	23	16	24	19
15	Erysipelas	42	41	23	33
16	Pleuritis	...	29	23	31
17	Measles	30	26	21	21
18	Dysentery	24	21	18	17
19	Whooping-cough	28	21	18	19
20	Cholera infantum	21	19	16	19
21	Diphtheria	21	13	13	15
22	Inflam. of Brain	12	13	10	10
23	Typhoid Fev. (ent.)	10	9	9	10
24	Puerperal Fever	12	11	7	11
25	Typho-mal. Fever	18	12	5	5
26	Membran. Croup	7	5	4	1
27	Small-pox	2	0.3	4	1
28	Cerebro-spi. men.	8	6	3	1
	Observers §	91	104	118	128

* For 1894 the number of observers, reports, weeks in each month, etc., are stated in the first five columns of the tables stated in Exhibit V., pages 94-96. † The numbers in this line are an average, not for all diseases represented.

a For first part of Table 1, and full heading, see page 97.

Reported Present by Months in each of the years 1893–94, and the Average by Months for the Period of seventeen years, 1877–1893.

Per Cent of Observers by whom the Diseases were Reported Present.‡

July.* Diseases.	Av. '77–'93.	Av. '86–'93.	1894.	1893.	August.* Diseases.	Av. '77–'93.	Av. '86–'93.	1894.	1893.	September.* Diseases.	Av. '77–'93.	Av. '86–'93.	1894.	1893.	Line number.
Average †	40	37	29	29	Average †	42	39	35	34	Average †	42	38	33	31	
Rheumatism	79	80	79	76	Diarrhea	95	93	89	90	Diarrhea	92	89	85	86	1
Diarrhea	86	86	75	78	Rheumatism	75	77	76	79	Neuralgia	76	77	71	66	2
Neuralgia	79	80	69	73	Neuralgia	75	77	73	73	Rheumatism	77	79	70	74	3
Tonsillitis	57	58	54	63	Dysentery	72	68	67	57	Dysentery	68	65	64	59	4
Bronchitis	60	61	50	57	Cholera morbus	76	74	64	69	Bronchitis	63	64	63	57	5
Consumption, Pul.	63	55	47	48	Tonsillitis	56	58	63	66	Cholera morbus	63	61	60	59	6
Cholera morbus	67	6	46	47	Bronchitis	57	59	60	54	Cholera infantum	57	55	52	53	7
Intermittent Fever	77	62	44	45	Cholera infantum	65	63	59	55	Tonsillitis	59	58	51	55	8
Cholera infantum	47	46	41	31	Intermittent Fever	78	63	47	49	Intermittent Fever	77	60	46	40	9
Dysentery	48	43	36	24	Consumption, Pul.	62	56	42	48	Consumption, Pul.	61	53	45	43	10
Remittent Fever	57	45	29	30	Inflam. of Bowels	38	40	40	46	Remittent Fever	63	49	44	34	11
Inflam. of Bowels	34	33	27	29	Remittent Fever	62	50	39	38	Influenza	41	39	37	31	12
Inflam. of Kidney	34	34	27	30	Influenza	32	29	37	28	Typhoid Fev. (ent.)	30	29	34	28	13
Influenza	31	30	25	28	Inflam. of Kidney	31	30	30	22	Inflam. of Bowels	32	33	29	27	14
Scarlet Fever	19	13	22	13	Typhoid Fev. (ent.)	23	23	24	21	Erysipelas	34	33	28	19	15
Erysipelas	39	36	21	29	Whooping-cough	32	25	23	20	Inflam. of Kidney	27	27	23	22	16
Pleuritis	...	23	20	21	Pleuritis	...	19	21	15	Pleuritis	...	23	21	18	17
Pneumonia	32	35	18	17	Erysipelas	34	34	20	20	Scarlet Fever	18	14	21	13	18
Whooping-cough	32	25	17	20	Scarlet Fever	18	13	20	16	Typho-mal. Fever	46	32	19	17	19
Typhoid Fev. (ent.)	13	13	15	12	Pneumonia	27	20	18	15	Whooping-cough	29	21	19	14	20
Measles	21	17	11	17	Typho-mal. Fever	34	26	15	19	Pneumonia	32	24	16	19	21
Typho-mal. Fever	22	15	6	6	Diphtheria	22	13	15	16	Diphtheria	24	15	13	11	22
Diphtheria	21	12	6	13	Inflam. of Brain	14	12	13	9	Inflam. of Brain	11	10	13	5	23
Inflam. of Brain	13	13	6	7	Cerebro-spi. men.	8	6	7	3	Puerperal Fever	10	9	5	9	24
Puerperal Fever	11	10	5	9	Measles	11	9	6	6	Cerebro-spi. men.	8	6	4	6	25
Cerebro-spi. men.	8	7	3	4	Puerperal Fever	10	9	6	7	Measles	7	6	2	2	26
Membran. Croup	4	4	3	1	Membran. Croup	5	4	2	4	Membran. Croup	7	5	0	1	27
Small-pox	2	0.1	2	0	Small-pox	0.7	0.1	2	0	Small-pox	0.6	0.2	0	0	28
Observers §.	95	110	131	126	Observers §.	98	113	131	121	Observers §.	97	114	128	125	

October.* Diseases.	Av. '77–'93.	Av. '86–'93.	1894.	1893.	November.* Diseases.	Av. '77–'93.	Av. '86–'93.	1894.	1893.	December.* Diseases.	Av. '77–'93.	Av. '86–'93.	1894.	1893.	Line number.
Average †	41	37	34	30	Average †	38	35	28	32	Average †	38	35	28	28	
Rheumatism	83	84	80	79	Rheumatism	84	84	76	78	Rheumatism	86	86	78	78	1
Diarrhea	78	77	77	79	Neuralgia	82	82	75	78	Bronchitis	82	81	72	77	2
Neuralgia	80	80	76	73	Bronchitis	78	77	70	80	Neuralgia	83	83	69	78	3
Bronchitis	77	72	72	70	Tonsillitis	77	77	62	77	Tonsillitis	80	79	68	74	4
Tonsillitis	69	71	69	67	Influenza	57	59	52	86	Influenza	66	72	66	98	5
Influenza	47	46	48	42	Diarrhea	56	55	42	54	Pneumonia	71	56	47	50	6
Remittent Fever	62	49	46	31	Consumption, Pul.	64	55	39	47	Diarrhea	47	48	45	39	7
Dysentery	45	42	43	48	Pneumonia	58	45	38	52	Consumption, Pul.	65	57	34	45	8
Consumption, Pul.	64	54	40	41	Remittent Fever	55	44	34	39	Remittent Fever	49	39	24	20	9
Intermittent Fever	76	60	38	43	Intermittent Fever	70	54	33	36	Intermittent Fever	63	47	30	23	10
Typhoid Fev. (ent.)	33	30	38	32	Pleuritis	...	32	29	27	Scarlet Fever	28	22	29	21	11
Inflam. of Kidney	33	32	34	20	Scarlet Fever	24	18	29	18	Erysipelas	42	41	27	30	12
Cholera morbus	31	29	33	25	Inflam. of Kidney	33	32	28	27	Inflam. of Kidney	34	33	26	21	13
Pleuritis	...	22	32	20	Erysipelas	40	40	25	25	Pleuritis	...	41	23	35	14
Scarlet Fever	23	18	30	17	Typhoid Fev. (ent.)	28	25	24	29	Typhoid Fev. (ent.)	20	16	21	13	15
Pneumonia	42	34	28	22	Dysentery	23	22	21	23	Inflam. of Bowels	28	29	18	18	16
Cholera infantum	26	25	27	30	Whooping-cough	25	18	19	14	Whooping-cough	25	16	17	16	17
Inflam. of Bowels	30	30	22	27	Inflam. of Bowels	26	26	18	21	Diphtheria	33	19	17	11	18
Erysipelas	39	37	21	23	Diphtheria	33	20	17	13	Cholera morbus	12	11	10	7	19
Typho-mal. Fever	48	33	18	16	Typho-mal. Fever	35	22	13	13	Puerperal Fever	11	10	9	5	20
Whooping-cough	25	17	18	9	Cholera morbus	15	15	11	19	Typho-mal. Fever	27	16	8	8	21
Diphtheria	32	18	17	9	Membran. Croup	16	13	8	9	Inflam. of Brain	11	12	7	7	22
Inflam. of Brain	10	10	10	7	Puerperal Fever	11	10	8	10	Dysentery	15	15	7	7	23
Membran. Croup	12	10	10	2	Cholera infantum	9	9	5	7	Membran. Croup	18	14	5	4	24
Puerperal Fever	11	10	8	7	Inflam. of Brain	11	10	4	8	Cholera infantum	5	6	4	2	25
Cerebro-spi. men.	8	5	5	3	Cerebro-spi. men.	6	5	3	4	Measles	12	10	4	3	26
Small-pox	0.4	0.1	2	0	Measles	9	8	3	3	Cerebro-spi. men.	7	8	2	4	27
Measles	7	7	1	2	Small-pox	1	0.5	1	0	Small-pox	1.5	0.5	0	0	28
Observers §.	96	111	115	123	Observers §.	95	110	119	122	Observers §.	93	106	116	121	

mns of Exhibit III., page 90, the names of observers and the number of reports received from each are nted, but only for those reported present in the given month. ‡ See foot-note with this mark on page 103.
§ The numbers in this line state how many observers reported for the month in the given year.

TABLE 2.—WEEKLY REPORTS OF DISEASES IN MICHIGAN IN 1894.—*Exhibiting for the Year and for each Month of the Year Ending Saturday, December 29, 1894, a Summary relative to diseases in the State of Michigan; also for each month a Summary relative to Diseases in each of 11 Geographical Divisions* of the State.—Indicating the prevalence as regards Time and Area. Compiled from 5,572 Weekly Reports by 189 Observers, Health Officers of Cities and Villages, Regular Correspondents of the State Board of Health, and other Physicians, Reporting the Diseases under their observation.*

Number of Observers, Reports, etc.	Diseases.	(Av. b) Per Cent of Observers reporting presence of.	Average Per Cent of Weeks Reported Present Where Present. c	Per Cent of Reports Stating Presence of. d	Average Order of Prevalence Where Present. e	Average Order of Prevalence where present.													
						1893.	1892.	1891.	1890.	1889.	1888.	1887.	1886.	1885.	1884.	1883.	1882.	Av. 1877-1893.	Av. 1886-1893.
Ending December 29, 1894.†	Average for tabulated diseases reported present	30	64	20	3.0	3.3	3.1	3.3	3.3	3.3	3.5	3 7	3.7	3.8	4.2	4.2	4.2	3.9	3.4
localities represented, 164.	Brain, Inflammation of	9	34	3	4.8	4.3	3.9	4.9	5.4	4.8	6.4	6.2	5.9	6.0	6.4	6.6	6.6	6.0	5.2
localities represented per month, 106.	Bowels, Inflammation of	27	47	13	3.8	4.0	4.1	4.3	4.4	4.1	4.6	5.0	5.0	5.1	5.8	6.1	6.0	5.2	4.4
Observers during the year, 189.	Bronchitis	67	78	50	2.6	2.5	2.6	2.7	2.6	2.7	2.7	3.0	3.0	3.1	3.2	3.2	3.3	3.0	2.7
Observers per month, 116.	Cerebro-Spinal Meningitis	4	35	1	3.9	4.4	3.7	5.3	4.7	4.2	4.6	7.8	7.3	6.9	6 9	7.4	7.2	6.2	5.3
reports compiled, 5,572, a	Cholera Infantum	20	54	12	3.3	3.4	3.6	3.8	3 5	3 4	4.0	4.1	3.9	4.6	4.8	4.8	4.9	4.4	3.7
reports per month, 464.	Cholera Morbus	27	53	14	3.3	3.3	3.4	3.4	3.5	3.4	3.7	3.8	4.2	4.5	4.9	5.0	5.2	4.4	3.6
	Consumption, Pulmonary	43	83	36	3.4	3.5	3.7	3.8	3.5	3.5	3.6	3.7	3.9	4.0	4.3	4.5	4.6	4.3	3.7
	Croup, Membranous	5	40	2	4.5	4.1	4.7	4.4	4.6	4.3	5.1	6.8	6.2	6.1	7.1	7.1	7.0	6.1	5.0
	Diphtheria	13	54	7	3.5	3.4	3.5	4.4	4.2	4.3	4.8	4.4	4.2	4.7	5.1	5.4	4.8	4.7	4.2
	Diarrhea	58	67	40	2.5	2.6	2.6	2.7	2.9	2.8	3.0	3.0	3.2	3.3	3.3	3.7	3.8	3.4	2.9
	Dysentery	27	52	14	3.3	3.6	3.8	3.8	3.8	3.7	3.8	4.3	4.5	5.0	5.0	5.2	5.3	4.7	3.9
	Erysipelas	27	47	13	3.8	3.9	4.1	4.2	4.1	4.1	4 4	4.7	4.5	4.6	5.2	5.5	5.5	5.1	4.3
	Fever, Intermittent	36	64	24	2.9	2.9	3.0	3.2	2.9	2.6	2.6	2.8	2.6	2.4	2.5	2.3	2.0	2.5	2.8
	Fever, Remittent	31	62	20	3.1	2.9	2.9	3.3	3.2	3.2	3.1	3.4	3.3	3.2	3.3	3.3	3.3	3.2	3.2
	Fever, Typhoid (Enteric)	18	61	11	3.6	3.2	3.6	3.5	3.8	3.9	4.2	4.5	4.7	4.7	5.2	5.1	5.1	4.9	3.9
	Fever, Typho-malarial	8	46	4	3.7	3.6	3.7	3.6	3.6	3.9	3.6	4.1	4.2	4.4	4.6	4.8	4.9	4.4	3.8

For the Year																				
	Whole number of	Influenza	55	73	41	3.3	3.0	3.1	2.0	2.3	3.4	2.7	3.0	2.7	2.9	3.3	3.3	3.1	2.8	2.4
	Average number of	Kidney, Inflammation of	31	55	17	3.7	3.7	3.6	3.9	4.1	4.1	4.5	4.9	4.7	4.4	5.0			4.3	4.2
	Whole number of	Measles	11	53	6	2.8	2.8	3.3	3.0	3.0	3.5	3.2	3.6	5.0	6.4	5.2	3.7	4.9	4.2	3.4
	Average number of	Neuralgia	74	74	56	2.5	2.5	2.5	2.8	2.7	2.6	2.7	2.8	2.8	2.8	3.3	3.3	3.6	2.8	2.7
	Total number of	Pleuritis	28	46	13	3.8	3.8	4.0	4.1	4.2	4.0	4.4							4.1	4.1
	Average number of	Pneumonia	36	56	20	3.7	3.6	3.7	4.0	3.9	3.7	4.0	4.3	4.0	4.4	4.5	4.7	4.4	4.3	3.9
		Puerperal Fever	6	36	2	3.9	3.8	4.1	4.5	4.5	3.4	4.6	5.7	5.9	6.3	6.9	7.3	6.2	5.8	4.6
		Rheumatism	78	78	62	2.6	2.6	2.7	2.9	2.9	2.8	3.0	3.2	3.2	3.2	3.6	3.7	3.8	3.5	2.9
		Scarlatina	24	59	14	3.3	3.6	3.2	4.2	4.2	3.9	4.6	5.0	4.5	5.0	5.2	5.2	4.9	4.8	4.2
		Small-pox	1	47	0.6	4.1	4.8	5.0	0	6.5	11.0	15.3	26 0	25.9	8.4	26.0	14.0	9.1	11.1	11.0
		Tonsillitis	64	64	42	3.0	2.8	2.9	3.3	3.4	3.3	3.4	3.4	3.4	3.5	3.7	3.9	3.9	3.6	3.4
		Whooping-cough	18	63	12	2.9	3.0	3.0	2.9	3.2	3.3	3 9	4.2	3.7	4.1	4.5	5.2	4.4	4.2	3.4

* For counties in each Division, see Exhibit I., page 87.

† For number of Observers, reports, weeks in each month, etc., see Exhibit III., page 90, for names of observers, and number of reports received from each, see Exhibit V., pages 94, 95 and 96.

a Not every one of the observers sent in a report for every week, so that the number of reports received does not equal the number of observers multiplied by the number of weeks.

b The numbers in this column (pages 100-103) state not what per cent of the whole number of observers for the year reported the disease present at some time during the year, but the average (for the twelve months) of the per cents (of observers making reports for the several months) by which the disease was reported present in those months. The column for the year is thus a statement for an average *month*. But on Pages 102 and 103 the numbers in the "Per Cent of Observers" column are statements for the month, and not averages. This column indicates the Area of Prevalence except that in a few instances there were two or more observers in one city or village.

c This column states for the year or given month, what per cent the number of reports which stated a disease to be present is of the number of card-reports received, for the given time, from such of the observers as reported the diseases present. It is therefore an average, not for all localities represented, but only for those at which the given disease was reported present. In the line "Average for Tabulated Diseases" it states what per cent the number of times *all* diseases were reported present is of the number of times they *might have been* so reported on the cards received, for the time specified, from the observers who during that time reported the diseases present (that is, if each of the observers had on every card he sent reported every disease present which he reported present at all). It will be seen that this is a more accurate average than would be obtained by dividing the sum of the column by the number of diseases reported present.

d This column states what per cent the number of reports stating presence of a disease is of the whole number of reports received for the time specified, from *all observers* in the State or Division, as the case may be. It combines, and states in a general way, an idea of the *time* a disease was prevalent, with an idea of the area of its prevalence. Had every observer sent a report every week of the month or year, the numbers in this column would be (for the State) the product of the numbers in the same line in the two preceding columns.

e The disease having the greatest number of cases was to be marked 1 in the order; the disease having the next greatest number of cases, 2; and so on. Diseases not present were to be marked 0. The numbers in this column are found by dividing the totals (for the State) of the Order of Prevalence column, in Table 3 (a table giving statements for each locality, omitted in printing this Report, for want of room), by the number of men who reported the disease present. The column is, therefore, an average, not for all the localities represented, but only for those at which the given disease was reported present. The numbers in the "Average" lines for this column are found by dividing the sum of the totals in the Order of Prevalence columns, in Table 3, for all diseases reported present, by the sum of the numbers of men who reported the different diseases present, thus counting each man once for every disease he reported present. As a rule, small numbers in this column indicate a large prevalence of the disease, and *vice versa*; but the greater the number of diseases reported present by each observer from week to week, the greater will be the "average" in this column.

TABLE 2.—CONTINUED.—*Diseases in the State, 1894.* (*For foot-notes and full tabular heads, see pages 100-101.*)

Months.†	Diseases.	Per cent of Observers Reporting Presence of, b	Average per cent of Weeks reported Present where Present, a, c	Per cent of Reports stating Presence of, d	Average Order of Prevalence where Present, e
January.†	Av. for Tab. Dis. Rep. Pres.	30	66	20	3.2
	Brain, Inflammation of	5	38	2	5.2
	Bowels, Inflammation of	30	41	13	4.5
	Bronchitis	78	80	63	2.4
	Cerebro-spinal Meningitis	3	47	1	3.7
	Cholera Infantum	3	20	1	4.7
	Cholera Morbus	9	27	2	4.3
	Consumption, Pulmonary	48	74	36	3.9
	Croup, Membranous	9	37	3	3.6
	Diphtheria	9	53	5	2.9
	Diarrhea	41	62	26	3.6
	Dysentery	15	24	5	5.0
	Erysipelas	30	48	15	4.2
	Fever, Intermittent	21	59	12	4.1
	Fever, Remittent	18	71	12	3.9
	Fever, Typhoid (enteric)	12	54	7	3.8
	Fever, Typho-malarial	2	30	1	4.5
	Influenza	98	89	87	1.4
	Kidney, Inflammation of	33	52	17	4.4
	Measles	6	44	2	3.7
	Neuralgia	80	71	63	2.7
	Pleuritis	39	42	17	3.8
	Pneumonia	59	62	37	3.6
	Puerperal Fever	11	32	3	5.4
	Rheumatism	82	79	65	2.9
	Scarlatina	20	47	9	3.5
	Small-pox	0	0	0	0
	Tonsilitis	77	69	54	3.2
	Whooping-cough	15	53	8	2.9
February.†	Av. for Tab. Dis. Rep. Pres.	27	69	19	3.2
	Brain, Inflammation of	7	38	3	7.0
	Bowels, Inflammation of	20	52	11	4.6
	Bronchitis	71	86	60	2.5
	Cerebro-spinal Meningitis	1	25	0.3	2.0
	Cholera Infantum	0	0	0	0
	Cholera Morbus	3	33	1	4.3
	Consumption, Pulmonary	39	85	33	3.7
	Croup, Membranous	5	44	2	5.2
	Diphtheria	14	55	8	3.1
	Diarrhea	36	47	17	3.7
	Dysentery	4	54	2	2.8
	Erysipelas	32	43	14	4.0
	Fever, Intermittent	25	64	16	4.1
	Fever, Remittent	20	67	14	3.7
	Fever, Typhoid (enteric)	7	79	5	3.7
	Fever, Typho-malarial	2	25	1	3.0
	Influenza	87	86	75	1.7
	Kidney, Inflammation of	35	57	20	3.8
	Measles	10	47	5	2.1
	Neuralgia	80	73	59	2.6
	Pleuritis	30	54	16	3.9
	Pneumonia	54	59	32	3.4
	Puerperal Fever	8	34	3	6.6
	Rheumatism	80	85	67	2.8
	Scarlatina	21	67	14	3.9
	Small-pox	0	0	0	0
	Tonsilitis	69	74	51	3.0
	Whooping-cough	12	63	8	3.0
March.†	Av. for Tab. Dis. Rep. Pres.	29	68	20	3.1
	Brain, Inflammation of	10	31	3	5.2
	Bowels, Inflammation of	27	47	14	3.9
	Bronchitis	76	77	61	2.3
	Cerebro-spinal Meningitis	3	33	1	6.0
	Cholera Infantum	3	33	1	5.0
	Cholera Morbus	8	38	3	4.1
	Consumption, Pulmonary	41	80	33	3.2
	Croup, Membranous	2	50	1	5.5
	Diphtheria	12	65	8	2.7
	Diarrhea	42	55	24	3.0
	Dysentery	9	39	4	2.7
	Erysipelas	34	48	16	4.0
	Fever, Intermittent	34	70	25	3.4
	Fever, Remittent	20	68	14	3.4
	Fever, Typhoid (enteric)	7	58	4	5.3
	Fever, Typho-malarial	4	47	2	3.5
	Influenza	79	82	66	1.9
	Kidney, Inflammation of	35	60	22	3.8
	Measles	15	64	9	2.8
	Neuralgia	78	80	64	2.4
	Pleuritis	32	52	17	4.4
	Pneumonia	49	58	30	3.7
	Puerperal Fever	3	25	1	8.3
	Rheumatism	79	86	69	2.5
	Scarlatina	22	61	13	3.5
	Small-pox	2	25	1	7.0
	Tonsilitis	71	70	50	3.1
	Whooping-cough	17	50	8	2.5
April.†	Av. for Tab. Dis. Rep. Pres.	30	67	20	3.2
	Brain, Inflammation of	12	49	6	5.3
	Bowels, Inflammation of	27	49	14	4.0
	Bronchitis	77	75	58	2.5
	Cerebro-spinal Meningitis	7	39	3	3.8
	Cholera Infantum	6	39	2	5.0
	Cholera Morbus	11	56	6	5.1
	Consumption, Pulmonary	48	84	41	3.5
	Croup, Membranous	6	39	2	3.8
	Diphtheria	10	53	6	4.4
	Diarrhea	48	55	26	3.2
	Dysentery	10	46	4	4.1
	Erysipelas	29	47	14	4.3
	Fever, Intermittent	31	66	24	3.3
	Fever, Remittent	28	60	17	3.3
	Fever, Typhoid (enteric)	6	41	2	5.3
	Fever, Typho-malarial	3	33	1	4.0
	Influenza	66	80	55	2.3
	Kidney, Inflammation of	33	62	21	4.3
	Measles	26	57	15	2.5
	Neuralgia	79	75	61	2.4
	Pleuritis	34	54	19	3.9
	Pneumonia	46	64	30	3.6
	Puerperal Fever	5	28	1	1.8
	Rheumatism	76	84	66	2.5
	Scarlatina	28	70	17	3.2
	Small-pox	2	63	1	8.5
	Tonsilitis	71	69	50	3.1
	Whooping-cough	17	64	12	3.6
May.†	Av. for Tab. Dis. Rep. Pres.	31	61	19	3.1
	Brain, Inflammation of	12	30	4	4.9
	Bowels, Inflammation of	32	38	12	3.4
	Bronchitis	67	72	49	2.6
	Cerebro-spinal Meningitis	3	40	1	4.3
	Cholera Infantum	12	35	4	3.5
	Cholera Morbus	18	45	8	3.7
	Consumption, Pulmonary	48	84	40	3.4
	Croup, Membranous	8	38	3	3.7
	Diphtheria	15	42	6	3.4
	Diarrhea	48	56	27	3.1
	Dysentery	12	44	5	4.2
	Erysipelas	36	44	16	3.7
	Fever, Intermittent	37	65	24	3.3
	Fever, Remittent	23	60	14	3.8
	Fever, Typhoid (enteric)	13	44	6	4.3
	Fever, Typho-malarial	3	54	1	3.3
	Influenza	57	66	38	2.5
	Kidney, Inflammation of	39	57	23	3.7
	Measles	32	59	19	2.7
	Neuralgia	75	74	57	2.2
	Pleuritis	33	41	14	3.6
	Pneumonia	46	53	24	3.5
	Puerperal Fever	5	27	2	2.5
	Rheumatism	82	80	67	2.2
	Scarlatina	27	57	16	3.1
	Small-pox	2	60	1	3.5
	Tonsilitis	73	61	44	2.7
	Whooping-cough	21	54	12	3.6
June.†	Av. for Tab. Dis. Rep. Pres.	27	64	18	2.8
	Brain, Inflammation of	10	33	4	3.6
	Bowels, Inflammation of	26	52	13	3.4
	Bronchitis	59	69	42	2.4
	Cerebro-spinal Meningitis	2	45	1	5.7
	Cholera Infantum	16	47	8	3.6
	Cholera Morbus	27	54	14	3.3
	Consumption, Pulmonary	45	84	37	2.9
	Croup, Membranous	4	37	2	3.6
	Diphtheria	13	50	7	2.1
	Diarrhea	59	64	29	2.3
	Dysentery	18	41	7	3.9
	Erysipelas	23	50	12	3.3
	Fever, Intermittent	37	68	26	2.7
	Fever, Remittent	29	67	20	2.9
	Fever, Typhoid (enteric)	9	54	5	4.5
	Fever, Typho-malarial	5	61	2	1.8
	Influenza	33	64	21	2.5
	Kidney, Inflammation of	31	66	21	3.1
	Measles	21	59	13	2.2
	Neuralgia	68	75	51	2.2
	Pleuritis	23	47	11	3.1
	Pneumonia	25	59	15	3.3
	Puerperal Fever	7	48	4	3.4
	Rheumatism	76	77	60	2.3
	Scarlatina	24	64	15	2.9
	Small-pox	4	52	2	3.0
	Tonsilitis	53	58	30	2.7
	Whooping-cough	18	64	12	3.0

		July.†				August.†				September.†				October.†				November.†				December.†			
	Av. for Tab. Dis. Rep. Pres.	29	62	18	2.8	35	58	20	3.0	33	66	22	3.2	34	59	20	2.9	28	67	19	3.0	28	66	19	3.0
	Brain, Inflammation of	6	35	2	4.1	13	27	4	4.2	13	37	5	5.0	10	29	3	3.6	4	42	2	5.8	7	32	2	4.6
	Bowels, Inflammation of	27	46	18	3.7	40	47	18	3.7	29	51	15	4.0	22	50	11	3.4	18	57	11	3.4	18	41	8	3 5
	Bronchitis	50	64	32	2.9	60	59	36	3.1	63	69	43	3.2	72	73	52	2.4	70	75	53	2.4	72	80	57	2.3
	Cerebro-spinal Meningitis	3	27	1	3.8	7	35	3	3.1	4	45	2	3.4	5	28	1	3.7	3	31	1	4.5	2	25	0.5	4.0
	Cholera Infantum	41	52	22	2.8	59	64	38	2.8	52	63	33	3.5	27	46	13	3.7	5	35	2	4.0	4	32	1	2.4
	Cholera Morbus	46	57	27	2.7	64	59	38	2.7	60	61	37	3.3	33	40	13	3.6	11	48	5	2.9	10	37	4	4.5
	Consumption, Pulmonary	47	82	39	2.7	42	83	35	3.2	45	84	37	3.7	40	85	34	3.6	39	84	33	3.9	34	86	29	3.9
	Croup, Membranous	3	31	1	4.3	2	20	0.3	7.0	0	0	0	0	10	36	4	5.5	8	54	4	5.2	5	50	2	3.8
	Diphtheria	6	59	4	3.4	15	46	7	4.1	13	59	8	3.9	17	52	9	3.6	17	64	11	3.5	17	63	12	4.0
	Diarrhea	75	74	55	1.9	89	81	72	1 6	85	83	71	1.7	77	64	49	2.4	42	61	26	3.0	45	52	24	7.1
	Dysentery	36	53	20	3.3	67	57	38	3.0	61	63	40	3.0	43	47	20	3.0	21	43	9	3.6	7	61	4	5.0
	Erysipelas	21	44	10	3.3	20	42	9	4.3	28	52	13	4.1	21	45	10	3.5	25	54	13	3.1	27	50	14	3.7
	Fever, Intermittent	44	62	28	2.3	47	59	28	2.4	46	62	29	2.9	38	69	27	2.4	33	61	21	2.6	30	66	20	2.7
	Fever, Remittent	29	66	20	2.6	39	57	23	3.0	44	63	28	3.1	46	56	28	2.7	34	67	23	3.1	34	62	21	3.4
	Fever, Typhoid (enteric)	15	51	7	3.7	24	61	15	3.5	34	69	23	3.3	38	63	24	3.0	24	67	17	3.3	21	60	18	3 7
	Fever, Typhc-malarial	6	41	3	4.5	15	38	6	4.4	19	56	11	3.4	18	42	8	3.5	13	51	7	3.7	8	57	5	4.7
	Influenza	25	58	15	2.8	37	47	18	2.8	37	61	23	3.0	48	61	29	2 4	52	75	40	2.5	66	77	51	2.0
	Kidney, Inflammation of	27	53	15	3.4	30	42	13	4.0	23	56	13	3.9	34	42	14	3.5	28	63	18	3.5	28	59	15	3.4
	Measles	11	46	5	3.2	6	27	2	3.6	2	42	1	5.0	1	40	0.4	1.0	3	33	1	2.8	4	35	3	5 0
	Neuralgia	69	72	51	2.4	73	64	47	2.7	71	73	52	2.9	76	74	56	2.4	75	76	57	2.3	69	75	52	2.3
	Pleuritis	20	46	10	3.3	21	31	7	4.1	21	50	11	4.2	32	38	12	3.4	29	52	15	3.7	28	56	13	4.0
	Pneumonia	18	49	9	3.8	18	40	7	4.2	16	60	10	5.3	28	47	13	3.7	38	54	21	3.4	47	56	27	3.7
	Puerperal Fever	5	50	2	1.8	6	41	2	4.1	5	33	1	4 0	8	27	2	3.8	8	35	3	3.0	9	51	5	4.7
	Rheumatism	79	73	58	2.4	76	71	54	2.8	70	74	53	2.9	80	78	58	2.5	76	84	64	2.4	78	81	64	2.5
	Scarlatina	22	56	12	3.0	20	57	11	3.5	21	62	14	3.5	30	57	17	3.2	29	58	17	3.5	29	55	17	3.3
	Small-pox	2	38	1	5.0	2	38	0.5	2.5	0	0	0	0	2	30	1	1.5	1	75	1	2.0	0	0	0	0
	Tonsillitis	54	59	32	2.7	63	48	30	3.3	51	60	31	3.6	69	58	40	2.7	62	72	46	2.7	68	71	49	2.7
	Whooping-cough	17	69	12	3.2	23	57	13	2 8	19	67	13	3.4	18	70	13	2.4	19	71	14	2.2	17	78	14	2.2

[Foot-notes from page 97.]

† The numbers opposite the names of the diseases do not state what per cent of the whole number of observers for the year reported the disease present at some time during the year, but state (on an average for the 12 months of the year) by what per cent of the observers making reports for the several months, the disease was reported present in those months. The column for each year is thus a statement for an average month of that year. On the two following pages of this table, however, the columns for each month state what per cent of the observers for that month (the number of whom is stated at the foot of the column) reported the given disease in that month.

[Foot-note from pages 91, 92, 93 and 97.]

‡ Consumption, remittent fever, and typho-malarial fever were not printed on the first blanks used in making weekly reports (beginning with the month of September, 1876); neuralgia and tonsillitis were not printed on any blanks used prior to October, 1878, and not on all used for several months after that date; inflammation of brain and inflammation of bowels were not printed on any blanks used prior to July, 1879, and not on all used for several months after that date; inflammation of kidney was not printed on any of the cards used prior to October, 1883, and not on all used for several months after that date; pleuritis was not printed on any cards used prior to 1888; hence it is probable that the diseases were not so fully reported at first as were the other diseases.

TABLE 2.—CONTINUED.—*Diseases in the Upper Peninsular, the Northwestern, the Northern, and the Northeastern Divisions of the State for the years 1877–1893, also for the years 1886–1893, for the year and by Months in 1894.—Indicating what Per Cent of the Weekly Reports Received Stated the Presence of the Diseases Named.*[a]

Division.*	Diseases.	1877-1893.‡	1886-1893.	1894.†	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Division.*	1877-1893.‡	1886-1893.	1894.†	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	Av. for Tab. Dis. Rep. Pres.	27	25	23	23	20	22	22	19	20	23	28	27	26	28	26		29	26	19	17	18	23	17	21	18	21	20	20	18	18	16
Upper Peninsular Division.*	Brain, Inflammation of	7	8	7	3	0	0	14	9	8	0	10	9	9	6	13	Northwestern Division.*	5	7	1	0	0	0	0	0	0	4	3	0	0	0	0
	Bowels, Inflammation of	17	13	15	30	13	21	3	12	8	9	29	17	15	17	6		12	15	24	11	0	25	33	27	19	24	44	38	22	11	0
	Bronchitis	71	70	57	55	55	58	59	51	46	36	40	57	78	71	78		61	62	56	44	56	88	56	68	56	44	44	52	52	74	60
	Cerebro-spi. Meningitis	3	3	3	0	0	3	10	5	0	3	2	0	2	9	0		2	2	1	0	0	0	0	0	0	0	6	0	0	0	0
	Cholera Infantum	14	15	23	3	0	6	3	5	24	48	79	57	24	17	6		20	18	13	0	0	0	0	0	6	36	41	19	0	0	0
	Cholera Morbus	20	22	19	8	6	12	14	7	16	33	50	49	13	9	6		20	17	21	0	0	0	22	0	13	36	44	52	17	5	0
	Consumption, Pulmonary	61	44	52	50	39	48	62	51	46	52	43	54	65	65	41		44	51	24	0	0	0	22	32	23	28	25	29	22	32	27
	Croup, Membranous	5	5	2	5	0	0	0	5	5	0	0	0	2	6	3		5	3	4	0	0	13	0	9	13	4	0	0	4	11	0
	Diphtheria	10	12	14	10	13	18	7	7	16	6	5	23	15	29	28		12	6	2	0	11	0	0	0	0	0	3	5	4	5	0
	Diarrhea	61	62	45	45	23	42	48	37	43	48	67	57	46	38	38		51	43	54	78	44	25	22	32	56	84	84	76	35	26	33
	Dysentery	23	20	17	15	0	9	0	12	8	21	31	31	26	26	29		27	23	23	0	11	0	11	0	14	32	47	42	26	16	7
	Erysipelas	21	17	19	23	26	27	10	28	24	18	5	17	20	15	16		28	21	16	0	0	63	44	41	25	20	3	10	0	5	13
	Fever, Intermittent	7	6	4	3	3	0	0	0	3	6	10	3	2	6	4		56	31	32	0	11	50	33	50	50	32	25	38	30	21	27
	Fever, Remittent	10	4	1	0	0	3	3	2	0	0	0	0	0	0	0		35	33	14	0	11	0	0	9	0	0	16	14	13	26	13
	Fever, Typhoid (enteric)	29	28	32	25	19	15	10	14	16	30	52	71	61	44	13		11	12	5	0	33	13	11	5	0	0	0	5	4	0	13
	Fever, Typho-malarial	4	3	2	0	3	0	0	0	0	0	0	0	7	9	6		20	10	5	0	0	0	0	0	0	18	13	5	4	0	0
	Influenza	41	31	42	88	71	49	45	30	38	18	14	34	30	41	69		42	38	37	100	100	88	67	45	25	8	4	10	35	37	87
	Kidney, Inflammation of	30	23	22	25	26	27	31	5	22	21	10	23	15	32	31		25	19	16	22	11	38	11	18	38	28	13	5	4	16	7
	Measles	18	13	4	3	6	9	14	14	5	3	0	0	0	0	0		13	10	6	0	0	0	0	14	19	12	0	5	0	5	7
	Neuralgia	56	57	51	55	45	48	45	44	38	54	48	60	52	71	50		66	60	58	67	33	78	44	73	56	60	44	52	78	58	53
	Pleuritis	21	21	23	18	19	30	28	21	16	27	14	23	20	35	34		24	24	14	0	0	25	0	23	6	16	13	33	22	5	0
	Pneumonia	35	29	31	45	26	45	52	28	11	12	12	23	30	50	50		40	43	23	67	33	75	67	45	0	4	6	19	0	26	33
	Puerperal Fever	6	7	3	3	0	0	3	7	8	3	0	0	0	6	6		5	5	0.05	0	0	0	0	0	0	0	0	5	0	0	0
	Rheumatism	61	57	51	43	55	48	38	42	43	55	43	51	65	71	59		67	61	51	56	78	25	22	68	25	64	56	19	74	65	20
	Scarlet Fever	22	14	32	20	26	24	38	44	57	42	24	26	30	32	25		16	9	11	0	33	0	0	32	31	8	0	5	0	5	27
	Small-pox	0.4	0.1	0.2	0	0	3	0	0	0	0	0	0	0	0	0		0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tonsillitis	51	56	47	55	55	39	41	35	41	48	29	46	59	50	66		56	53	34	33	33	50	22	55	0	32	19	33	48	47	33
	Whooping-cough	20	16	20	25	26	27	28	14	11	21	29	29	41	44	66		14	7	5	11	0	0	0	14	13	0	3	5	0	11	0

	Av. for Tab. Dis. Rep. Pres.	20	20	15	23	23	24	16	14	17	19	20	15	11	14	26	24	25	16	14	18	25	21	23	23	27	28	19	25	25
Northern Division.*	Brain, Inflammation of	10	15	5	25	7	5	0	0	5	4	9	4	0	0	8	8	2	0	0	0	0	0	0	0	9	0	0	0	0
	Bowels, Inflammation of	9	12	12	20	20	20	4	10	5	30	5	0	0	0	16	16	22	50	50	38	25	15	25	25	0	0	0	38	0
	Bronchitis	49	47	68	95	78	80	65	57	70	67	64	77	44	60	70	65	60	50	50	50	75	75	43	50	40	64	50	63	100
	Cerebro-spl. Meningitis	5	6	0.4	0	0	0	0	0	0	0	0	0	0	0	2	1.2	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cholera Infantum	7	8	12	0	0	0	0	10	15	44	41	12	6	0	8	7	6	0	0	0	0	8	0	18	20	18	0	0	0
	Cholera Morbus	7	8	18	10	7	10	9	29	20	87	41	15	6	0	10	8	5	0	0	0	0	0	13	13	20	9	0	0	0
	Consumption, Pulmonary	36	47	13	40	27	30	20	10	0	4	5	0	0	0	44	34	19	0	0	50	0	31	0	0	10	36	10	25	0
	Croup, Membranous	2	3	1	0	7	0	4	0	0	0	0	4	0	0	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	Diphtheria	5	8	20	10	20	35	41	29	5	19	15	12	6	13	10	10	21	10	13	0	0	8	25	50	36	36	20	13	63
	Diarrhœa	25	17	41	35	20	40	13	9	56	70	83	38	31	20	51	44	87	30	0	0	50	15	14	75	40	64	60	63	25
	Dysentery	10	12	12	0	0	0	1	0	25	41	41	12	6	0	17	19	9	0	0	0	0	8	0	25	30	27	0	13	0
	Erysipelas	24	32	10	25	27	25	17	0	0	7	0	0	0	0	24	24	37	50	0	25	25	81	29	50	30	27	10	75	63
	Fever, Intermittent	27	27	15	20	33	60	13	0	15	19	9	0	13	0	87	44	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fever, Remittent	10	15	13	0	13	0	7	14	25	30	14	19	13	18	11	4	1	0	0	0	0	0	0	0	0	9	0	0	0
	Fever, Typhoid (enteric)	9	8	11	10	13	0	7	0	10	15	32	19	6	0	2	1.3	4	0	0	0	0	8	0	0	0	27	0	0	0
	Fever, Typho-malarial	7	5	2	0	0	0	0	10	0	0	5	8	0	0	6	4	8	0	0	0	13	0	0	0	21	55	0	0	0
	Influenza	33	31	37	80	60	60	47	24	20	22	14	19	13	40	49	56	58	70	70	85	75	46	43	50	40	36	60	50	100
	Kindey, Inflammation of	18	19	12	20	40	30	7	10	0	11	15	4	0	13	35	51	45	50	50	50	50	46	43	50	50	36	50	50	50
	Measles	8	5	2	0	0	0	0	0	0	0	0	0	0	0	8	7	3	0	0	13	0	15	0	0	0	0	0	0	0
	Neuralgia	50	44	48	60	53	60	39	43	50	37	55	42	44	47	70	64	54	50	50	50	69	69	43	50	40	64	50	63	50
	Pleuritis	24	24	12	10	33	25	30	5	20	0	5	15	19	0	12	12	36	10	0	25	50	54	43	33	30	64	40	83	33
	Pneumonia	20	19	20	25	40	55	20	9	10	4	14	8	13	33	27	23	15	0	0	25	25	31	0	13	20	0	0	0	18
	Puerperal Fever	6	4	2	5	0	5	7	0	0	0	5	0	0	0	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	Rheumatism	59	55	51	80	80	70	40	65	45	26	27	42	44	53	68	61	60	50	50	50	50	69	43	50	60	73	50	100	63
	Scarlet Fever	5	5	3	0	0	0	0	10	5	0	0	8	6	0	5	4	28	0	0	0	0	23	29	50	40	36	50	13	38
	Small-pox	0.1	0.1	2	0	0	0	0	0	0	0	0	8	19	0	0	7	1	0	0	0	0	0	14	0	0	0	0	0	0
	Tonsillitis	33	35	39	65	47	50	48	24	35	26	27	31	31	40	57	50	75	70	25	0	0	46	43	50	40	64	80	88	75
	Whooping-cough	8	6	12	0	0	0	0	14	15	30	38	12	6	20	2	1.3	4	0	0	0	0	0	0	0	20	18	0	0	25

*, †, ‡ See page 101. ‡ Inflammation of kidney was not compiled until 1884. For inflammation of brain and inflammation of bowels, an average for the 14 years, 1880–1893; for neuralgia and tonsillitis, an average for the 15 years, 1879-93; pleuritis was not compiled until 1888; for other diseases and for the average line, an average for the 17 years, 1877-1893. For the Northern Division, 1882-93. For the Northeastern Division, 1883-93.

TABLE 2.—CONTINUED.—*Diseases in the Western, Northern Central, Bay and Eastern, and the Central Divisions of the State, for the Years 1877–1893, also for the Years 1886–1893, for the Year and by Months in 1894, indicating what Per Cent of the Weekly Reports Received Stated the Presence of the Diseases Named.*[4]

Division.*	Diseases.	1877-1893.‡	1886-1893.	1894.†	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	Av. for Tab. Dis. Rep. Pres.	29	25	21	21	22	24	22	19	21	18	21	23	21	18	20
Western Division.*	Brain, Inflammation of	4	4	3	0	0	6	9	3	5	2	2	2	4	2	0
	Bowels, Inflammation of	16	15	18	21	27	28	6	14	27	17	21	13	18	12	18
	Bronchitis	53	51	40	47	57	50	44	49	44	23	16	43	47	33	50
	Cerebro-spi. Meningitis	3	3	5	9	0	0	9	0	2	0	15	11	4	2	2
	Cholera Infantum	14	10	11	2	0	0	0	5	7	17	31	38	9	0	2
	Cholera Morbus	18	15	10	0	0	0	0	3	0	26	31	21	12	2	2
	Consumption, Pul.	46	41	32	35	40	42	35	43	32	40	48	30	21	10	16
	Croup, Membranous	6	5	1	5	0	0	3	0	0	0	0	0	0	0	2
	Diphtheria	20	10	4	2	20	11	3	5	7	0	3	0	0	0	0
	Diarrhea	46	45	45	26	17	31	24	27	46	62	79	81	54	24	34
	Dysentery	22	16	21	7	3	17	18	0	17	17	56	60	19	31	2
	Erysipelas	26	21	16	21	20	17	18	0	20	11	3	23	26	27	11
	Fever, Intermittent	64	51	32	9	20	39	32	35	39	38	30	43	32	27	36
	Fever, Remittent	54	39	24	21	27	25	15	8	29	19	26	30	35	22	27
	Fever, Typhoid (enteric)	9	7	7	7	0	0	9	11	0	2	0	0	23	16	16
	Fever, Typho-malarial	20	13	4	2	3	8	0	0	0	0	3	21	4	4	0
	Influenza	46	45	45	93	77	67	56	46	22	17	18	21	42	53	61
	Kidney, Inflammation of	17	17	28	12	43	31	24	27	34	19	28	23	21	35	41
	Measles	6	10	9	12	10	28	32	27	7	4	0	0	0	4	0
	Neuralgia	70	70	60	60	63	67	74	54	49	51	51	68	70	61	55
	Pleuritis	20	20	21	30	43	31	32	11	22	13	15	21	14	16	16
	Pneumonia	35	29	19	42	33	25	32	3	27	9	5	6	16	8	36
	Puerperal Fever	6	5	7	5	3	3	0	0	15	11	8	6	7	8	14
	Rheumatism	63	64	62	51	50	69	74	62	66	53	59	45	61	73	82
	Scarlet Fever	18	10	10	14	10	22	18	14	5	0	3	4	16	8	5
	Small-pox	0.6	0.1	1	0	0	0	0	3	5	0	0	0	0	0	0
	Tonsillitis	52	50	37	49	57	43	41	35	39	34	33	23	28	37	32
	Whooping-cough	13	11	9	14	3	3	9	3	12	9	7	2	7	20	11

Division.*	Diseases.	1877-1893.‡	1886-1893.	1894.†	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	Av. for Tab. Dis. Rep. Pres.	24	20	18	27	21	23	0	19	12	14	17	22	18	16	18
Northern Central Division.*	Brain, Inflammation of	2	2	2	0	0	0	0	14	5	0	0	6	0	0	0
	Bowels, Inflammation of	5	4	5	0	17	0	0	7	5	9	4	11	0	0	0
	Bronchitis	50	47	32	50	33	44	0	14	14	18	22	39	24	53	65
	Cerebro-spi. Meningitis	5	2	0.5	0	0	0	0	0	0	4	0	0	0	0	0
	Cholera Infantum	11	11	15	0	0	0	0	14	5	35	41	22	12	0	0
	Cholera Morbus	14	12	7	0	0	0	0	7	9	9	19	11	8	0	0
	Consumption, Pul.	34	31	32	50	33	33	0	36	18	22	37	33	36	37	30
	Croup, Membranous	6	2	3	0	0	0	0	0	5	4	0	0	8	11	0
	Diphtheria	18	5	5	0	0	0	0	0	0	9	11	6	8	0	5
	Diarrhea	41	35	54	50	25	56	0	36	50	74	81	94	44	32	25
	Dysentery	15	12	19	20	0	0	0	0	5	35	41	50	20	5	0
	Erysipelas	25	20	10	70	33	22	0	0	0	0	0	11	4	5	15
	Fever, Intermittent	57	48	52	30	50	56	0	50	59	43	56	72	72	37	30
	Fever, Remittent	45	35	30	40	50	56	0	21	14	22	30	44	28	32	25
	Fever, Typhoid (enteric)	7	5	23	0	0	22	0	0	0	4	26	56	56	26	30
	Fever, Typho-malarial	19	10	4	0	0	11	0	0	0	0	7	17	4	5	0
	Influenza	16	20	22	100	75	44	0	14	14	9	7	11	12	11	20
	Kidney, Inflammation of	13	9	17	10	8	11	0	50	23	26	7	0	4	5	40
	Measles	8	9	3	0	0	0	0	0	14	0	4	0	0	5	0
	Neuralgia	53	51	47	80	83	78	0	57	32	39	37	56	44	42	25
	Pleuritis	5	5	10	30	0	11	0	43	5	0	0	0	12	11	20
	Pneumonia	29	26	13	40	25	11	0	29	5	0	0	11	0	21	30
	Puerperal Fever	5	6	10	50	25	0	0	14	5	9	7	0	8	11	0
	Rheumatism	58	58	43	70	58	89	0	79	45	35	26	22	20	21	75
	Scarlet Fever	9	10	14	20	25	0	0	0	0	0	4	17	28	37	20
	Small-pox	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tonsillitis	52	45	23	60	50	56	0	43	9	0	7	11	20	26	30
	Whooping-cough	12	9	11	0	8	33	0	0	0	0	11	6	20	26	20

	Av. for Tab. Dis Rep. Pres.	30	25	17	16	16	19	16	15	13	15	20	22	18	17	16		25	23	19	21	19	19	21	20	13	17	17	21	19	18	18
Bay and Eastern Division.*	Brain, Inflammation of...	6	5	2	3	2	4	4	1	0	0	0	8	1	0	2	Central Division.*	4	4	5	0	7	7	6	3	6	4	7	6	7	1	4
	Bowels, Inflammation of..	20	20	10	7	8	16	14	5	5	15	26	11	3	5	3		14	15	16	19	11	9	20	14	19	15	14	20	22	16	8
	Bronchitis.....	67	60	42	59	43	60	47	34	39	26	38	38	32	52	53		54	55	56	77	73	70	72	54	42	26	32	40	60	65	65
	Cerebro-spi. Meningitis...	5	4	1	0	2	0	0	1	2	0	3	5	1	0	2		4	3	0.6	3	0	0	2	0	0	0	0	1	1	0	0
	Cholera Infantum.....	16	15	13	0	0	0	4	1	3	15	46	47	16	4	2		10	8	9	1	0	0	0	8	14	24	18	30	9	1	0
	Cholera Morbus.....	20	18	13	1	0	0	0	7	6	22	38	55	7	0	2		14	14	14	3	1	6	2	13	14	29	36	33	11	0	3
	Consumption, Pul.....	63	54	35	33	38	42	35	36	30	32	28	39	41	39	36		53	44	35	41	46	34	48	42	37	30	27	33	31	26	28
	Croup, Membranous.....	8	5	1	3	0	0	4	3	0	1	0	0	3	2	2		3	3	1	2	4	0	0	2	0	0	1	0	2	1	0
	Diphtheria.....	21	11	12	16	13	7	10	14	13	11	11	8	11	14	14		15	6	5	0	3	3	2	2	2	3	5	8	9	10	10
	Diarrhea.....	45	43	35	6	12	16	14	23	31	45	78	80	53	21	20		43	44	42	28	23	24	44	36	40	59	69	70	56	29	19
	Dysentery.....	18	15	12	0	0	0	4	5	2	15	30	42	22	7	5		14	14	10	4	4	4	0	3	4	9	24	33	19	5	0
	Erysipelas.....	22	19	8	4	5	16	14	7	9	8	8	9	3	9	8		19	20	12	10	4	10	13	13	17	15	11	12	14	8	14
	Fever, Intermittent.....	60	36	12	3	7	11	0	10	14	16	22	24	22	7	5		60	45	22	18	19	27	34	24	21	24	20	23	19	17	17
	Fever, Remittent.....	37	23	14	4	8	5	4	3	13	15	18	17	30	25	24		41	34	20	10	14	17	19	13	14	21	21	37	27	25	24
	Fever, Typhoid (enteric)..	10	12	15	3	3	4	2	4	9	9	22	33	36	29	17		10	7	54	1	0	0	0	5	1	1	11	25	3	4	5
	Fever, Typho-malarial	24	16	5	0	0	5	0	0	5	3	1	8	18	16	10		14	9	2	2	0	0	0	4	4	0	2	0	3	8	1
	Influenza	41	39	38	56	62	64	57	36	9	5	24	9	20	41	56		38	40	42	81	71	54	45	40	26	20	23	27	33	42	47
	Kidney, Inflammation of..	19	17	6	6	8	11	8	10	3	4	3	11	3	5	0		22	22	18	27	13	26	22	20	16	10	13	11	19	26	19
	Measles.....	13	11	7	7	10	7	24	16	12	3	1	3	0	0	0		9	8	7	0	6	9	3	24	19	8	5	2	0	0	4
	Neuralgia.....	68	64	47	59	50	60	51	51	47	42	41	38	38	50	47		65	69	61	65	58	67	64	64	62	60	58	60	64	65	58
	Pleuritis	23	23	8	4	18	16	16	11	6	3	7	9	4	5	3		15	15	13	18	9	20	14	11	15	14	3	10	17	13	13
	Pneumonia.....	36	27	17	31	32	33	35	26	16	7	4	3	3	9	17		29	24	18	29	29	21	19	28	17	8	0	6	14	22	25
	Puerperal Fever.....	5	4	2	1	3	0	0	1	2	0	3	2	3	0	3		5	4	0.3	0	0	0	2	0	1	1	0	0	0	0	0
	Rheumatism	72	67	53	56	60	71	51	59	63	46	46	48	51	41	49		63	66	66	70	66	70	78	66	58	68	59	63	60	73	74
	Scarlet Fever.....	15	10	14	9	17	16	2	7	14	11	11	28	16	23	17		10	7	12	8	10	10	17	17	14	10	10	10	5	12	21
	Small-pox.....	1	0	0.3	0	0	0	0	0	0	1	1	0	0	0	0		0.3	0.1	0.1	0	0	0	0	0	1	0	0	0	0	0	0
	Tonsillitis.....	48	42	39	49	50	49	33	40	28	36	37	24	43	43	41		42	44	39	49	46	48	67	45	31	21	22	26	33	43	58
	Whooping-cough.....	20	18	14	0	5	4	14	10	8	18	12	26	22	30	22		14	11	8	13	13	10	9	9	11	10	8	5	3	1	0

*, †, d. See page 101. ‡ Inflammation of Kidney was not compiled until 1884. For inflammation of brain and inflammation of bowels, an average for the 14 years, 1880-93; for neuralgia and tonsillitis, an average for the 15 years, 1879-93; pleuritis was not compiled until 1888; for other diseases, and for the average line, an average for the 17 years, 1877-93.

TABLE 2.—CONTINUED.—*Diseases in the Southwestern and Southern Central Divisions of the State, for the years 1877–93; also for the years 1886–93, for the Year and by Months in 1894.—Indicating what Per Cent of the Weekly Reports Received stated the Presence of the Diseases named.*[d]

Division.*	Diseases.	1877-93.‡	1886-93.	1894.†	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	Av. for Tab. Dis. Rep. Pres.	27	25	22	23	23	23	22	21	17	20	26	26	25	22	22
Southwestern Division.*	Brain, Inflammation of	3	3	2	0	0	0	0	2	2	0	7	5	0	2	2
	Bowels, Inflammation of	11	12	8	4	0	3	8	9	4	10	14	2	13	13	10
	Bronchitis	54	54	56	75	82	74	63	48	38	31	39	49	67	56	66
	Cerebro-spi. Meningitis	2	1	2	0	0	0	3	6	6	2	2	0	0	0	0
	Cholera Infantum	18	15	15	0	0	0	3	0	2	29	66	51	15	0	0
	Cholera Morbus	16	17	16	2	0	0	0	0	15	37	56	44	21	2	0
	Consumption, Pulmonary	64	55	40	42	44	28	39	41	40	47	41	54	35	35	29
	Croup, Membranous	4	4	6	9	8	8	8	11	2	4	2	0	6	13	0
	Diphtheria	10	4	2	0	0	0	5	2	0	0	7	2	2	4	0
	Diarrhea	38	38	35	35	8	18	18	19	31	61	66	63	54	13	17
	Dysentery	15	16	16	4	0	0	3	2	2	33	59	51	25	2	0
	Erysipelas	22	23	18	12	23	28	11	19	8	6	20	27	17	21	29
	Fever, Intermittent	65	45	36	22	28	36	42	37	38	39	31	32	54	35	39
	Fever, Remittent	42	31	36	16	13	26	37	35	33	37	37	49	56	44	39
	Fever, Typhoid (enteric)	6	5	6	5	5	5	0	2	0	2	12	10	6	21	7
	Fever, Typho-malarial	18	16	7	0	0	0	3	4	4	4	10	27	17	10	15
	Influenza	44	43	56	98	100	95	71	54	31	25	25	44	42	46	59
	Kidney, Inflammation of	16	17	15	15	23	10	24	33	15	10	14	12	13	8	2
	Measles	10	11	4	2	3	3	18	11	13	0	0	0	0	0	2
	Neuralgia	69	64	67	82	81	90	76	69	63	51	47	63	60	69	66
	Pleuritis	18	18	18	20	10	18	13	20	4	2	8	2	10	25	17
	Pneumonia	30	29	20	44	46	36	32	24	17	0	3	5	6	19	22
	Puerperal Fever	3	4	3	7	3	3	3	2	2	2	0	2	4	0	10
	Rheumatism	76	76	80	84	100	92	79	83	71	69	76	73	77	79	83
	Scarlet Fever	11	8	12	9	10	8	16	7	8	12	14	2	19	17	24
	Small-pox	0.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tonsillitis	45	46	46	62	51	67	47	44	25	29	34	27	44	65	66
	Whooping-cough	14	14	10	0	0	3	3	7	10	18	27	20	10	8	5
Southern Central Division.*		1877-93.‡	1886-93.	1894.†	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
		27	25	21	20	19	19	23	21	21	22	23	23	23	21	21
		4	4	3	1	4	3	8	3	5	2	2	2	1	4	1
		14	13	14	8	8	10	16	16	22	15	15	24	8	13	11
		62	59	49	59	56	54	58	49	44	43	42	40	49	47	46
		3	2	0.5	0	0	4	1	0	0	1	0	0	0	0	0
		10	10	8	0	0	3	5	5	4	17	31	22	10	1	0
		18	16	19	2	0	3	14	16	24	35	40	39	22	19	12
		56	48	36	36	19	25	36	31	44	51	40	34	39	36	38
		3	2	2	0	1	0	1	0	0	0	0	0	7	6	5
		12	7	8	4	5	6	4	3	3	2	7	10	15	19	20
		47	48	41	24	20	20	25	29	46	54	83	77	49	26	28
		18	19	16	7	2	1	7	14	14	21	42	41	20	12	9
		17	17	10	12	13	5	12	17	6	2	8	12	5	9	15
		6	43	32	15	17	24	34	37	35	38	44	39	41	32	30
		46	36	27	2	19	11	30	22	35	33	31	39	31	26	21
		8	7	11	9	5	4	1	6	10	11	14	19	29	15	13
		15	10	4	0	0	0	1	1	1	6	11	8	8	5	6
		42	48	42	8	79	81	58	32	16	13	14	20	26	42	46
		17	16	17	13	15	20	26	32	30	23	8	7	12	12	6
		10	8	5	0	0	6	11	19	13	8	1	0	2	1	2
		70	72	64	66	65	66	66	63	63	61	62	55	72	60	68
		17	17	9	16	18	8	15	8	9	6	3	1	7	11	9
		33	28	25	41	32	25	25	19	16	19	20	19	24	28	30
		3	2.8	2	2	5	0	1	1	1	0	5	0	1	4	6
		72	75	72	72	70	70	78	79	70	71	65	66	72	73	73
		14	12	15	9	15	14	20	15	16	11	9	16	28	15	17
		0.4	0.1	2	0	0	1	5	3	6	2	2	0	1	0	0
		51	52	53	61	63	61	59	53	37	42	42	51	49	54	60
		15	13	12	10	8	10	19	19	18	14	10	11	13	7	4

*, †, d See page 101. ‡ Inflammation of kidney was not compiled until 1884. For inflammation of brain and inflammation of bowels, an average for the 14 years, 1880–93; for neuralgia and tonsillitis, an average for the 15 years, 1879–93; pleuritis was not compiled until 1888; for other diseases and for the average line, an average for the 17 years, 1877–93.

TABLE 2.—CONCLUDED.—*Diseases in the Southeastern Division of the State, for the Years 1877-93, also for the years 1886-93, for the Year and by Months in 1894.—Indicating what per cent of the Weekly Reports Received stated the Presence of the Diseases named.*[a]

Division.*	Diseases.	1877-93.‡	1886-93.	1894.†	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	Av. for Tab. Dis. Rep. Pres.	30	24	14	15	15	14	16	17	17	12	15	15	13	13	10
Southeastern Division.*	Brain, Inflammation of	11	7	0.7	0	0	0	3	0	0	3	2	0	0	0	0
	Bowels, Inflammation of	17	13	5	6	8	7	3	10	3	0	2	11	6	3	0
	Bronchitis	66	62	40	47	64	44	50	45	43	20	37	29	43	40	38
	Cerebro-spinal Meningitis	6	3	0.9	0	0	0	6	0	0	0	0	0	4	0	0
	Cholera Infantum	14	10	7	0	0	0	0	0	3	8	21	9	19	0	5
	Cholera Morbus	20	15	9	0	0	0	0	0	19	13	25	29	2	3	3
	Consumption, Pulmonary	71	58	44	12	32	23	53	64	70	60	49	47	36	34	27
	Croup, Membranous	9	5	2	9	0	0	0	0	3	0	0	0	0	0	8
	Diphtheria	23	12	3	0	0	7	0	5	5	0	0	0	6	8	5
	Diarrhea	49	44	22	3	4	11	3	14	22	23	46	42	30	26	16
	Dysentery	22	16	9	3	0	4	0	0	8	10	25	22	13	6	0
	Erysipelas	30	25	9	18	16	11	13	17	8	10	5	0	0	14	3
	Fever, Intermittent	56	36	16	6	8	7	6	12	27	33	28	31	9	11	3
	Fever, Remittent	35	28	12	0	4	4	6	17	22	5	16	27	19	3	14
	Fever, Typhoid (enteric)	20	14	6	6	0	0	0	0	3	10	9	2	15	11	14
	Fever, Typho-malarial	19	10	2	0	0	0	0	0	0	0	7	13	2	0	0
	Influenza	42	38	29	24	60	41	44	31	11	5	9	22	17	31	27
	Kidney, Inflammation of	24	25	17	15	32	22	13	24	27	5	16	13	23	17	5
	Measles	15	10	10	0	4	19	31	33	22	10	4	0	0	0	0
	Neuralgia	55	53	27	41	44	37	41	31	30	25	21	18	21	20	11
	Pleuritis	14	14	11	26	8	0	22	14	16	5	5	7	4	14	14
	Pneumonia	35	24	16	41	32	11	22	31	14	5	11	4	11	17	5
	Puerperal Fever	3	6	1	3	0	0	0	0	5	0	0	0	2	3	3
	Rheumatism	71	69	47	53	64	59	59	52	70	45	39	44	32	37	24
	Scarlet Fever	22	12	14	0	12	15	19	17	3	18	21	20	15	20	3
	Small-pox	2.6	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tonsilitis	47	45	30	47	40	41	47	36	30	25	25	16	19	26	27
	Whooping-cough	21	18	7	0	0	4	3	21	16	8	9	0	2	9	14

*, †, d. See page 101. ‡ Inflammation of kidney was not compiled until 1884. For inflammation of brain and inflammation of bowels, an average for the 14 years, 1880-93; for neuralgia and tonsilitis an average for the 15 years, 1879-93; pleuritis was not compiled until 1888; for other diseases and for the average line an average for the 17 years, 1877-93.

TABLE 4.—*A Summary for the Year 1894, relative to Diseases in each of the Eleven Divisions of the State,—indicating the prevalence as regards both Time and Area.*

Diseases.	Upper Peninsular Division.*				Northwestern Division.*				Northern Division.*				Northeastern Division.*				Western Division.*			
	Per Cent of Observers Reporting Presence of. b	Av. Per Cent of Weeks Reported Present where Present. c	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence where Present. e	Per Cent of Observers Reporting Presence of. b	Av. Per Cent of Weeks Reported Present where Present. c	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence where Present. e	Per Cent of Observers Reporting Presence of. b	Av. Per Cent of Weeks Reported Present where Present. c	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence where Present. e	Per Cent of Observers Reporting Presence of. b	Av. Per Cent of Weeks Reported Present where Present. c	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence where Present. e	Per Cent of Observers Reporting Presence of. b	Av. Per Cent of Weeks Reported Present where Present. c	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence where Present. e
Av. for Tab. Dis. Reported Present.	34	66	23	3.4	33	58	19	3.0	30	58	18	2.5	30	69	25	3.1	35	59	21	2.7
Brain, Inflammation of	17	39	7	4.1	4	22	1	3.0	15	34	5	3.1	7	25	2	4.5	10	27	3	3.8
Bowels, Inflammation of	30	49	15	3.4	39	56	24	3.7	31	38	12	3.2	33	63	23	4.4	40	44	18	3.2
Bronchitis	74	75	57	2.6	81	67	56	2.5	79	84	68	2.0	67	90	60	2.9	70	57	40	2.8
Cerebro-spinal Meningitis	8	31	3	4.3	4	20	1	2.0	2	25	.04	2.0	0	0	0	0	10	46	5	3.9
Cholera Infantum	35	62	23	3.7	26	52	13	2.7	18	71	12	2.2	15	38	6	2.5	21	50	11	2.6
Cholera Morbus	33	54	19	4.1	37	56	21	3.4	38	46	18	2.7	15	36	5	3.5	22	42	10	2.6
Consumption, Pulmonary	61	83	52	3.4	33	75	24	4.0	21	57	13	2.5	30	60	19	3.6	44	72	32	2.7
Croup, Membranous	5	37	2	4.5	13	31	4	3.0	5	27	1	3.0	0	0	0	0	3	24	1	4.0
Diphtheria	22	64	14	3.8	9	25	2	1.8	30	67	20	1.9	41	49	21	2.3	8	41	4	3.2
Diarrhea	59	74	45	2.5	76	73	54	2.1	69	58	41	2.3	59	63	37	2.9	62	67	45	2.2
Dysentery	32	51	17	4.1	46	50	23	3.3	25	50	12	2.7	30	30	9	3.5	42	50	21	2.8
Erysipelas	36	54	19	4.4	33	47	16	3.2	18	55	10	2.9	59	62	37	3.9	34	49	16	3.2
Fever, Intermittent	9	37	4	4.7	46	71	32	2.7	33	45	15	3.0	0	0	0	0	56	56	32	2.2
Fever, Remittent	3	23	1	1.3	22	45	10	2.3	25	49	13	2.9	4	25	1	3.0	40	58	24	3.0
Fever, Typhoid (enteric)	44	69	32	3.0	18	42	5	3.3	18	61	11	2.9	7	57	4	4.0	11	65	7	2.8
Fever, Typho-malarial	4	56	2	4.0	11	40	5	4.0	5	50	2	2.0	15	64	8	4.0	9	43	4	3.3
Influenza	58	72	42	2.8	52	71	37	2.1	56	68	37	2.0	70	81	59	1.6	63	70	45	1.9
Kidney, Inflammation of	40	53	23	4.1	41	41	16	2.8	28	46	12	3.3	52	87	48	4.0	42	67	28	2.8
Measles	7	54	4	1.9	13	43	6	4.9	2	80	2	2.0	7	38	3	2.5	15	59	9	2.6
Neuralgia	68	72	51	3.0	81	68	58	3.1	79	62	48	2.5	59	92	54	1.8	81	74	60	2.1
Pleuritis	42	51	23	4.6	30	48	14	3.2	31	40	12	2.6	48	72	36	4.3	38	55	21	3.2
Pneumonia	48	62	31	3.9	43	58	23	3.6	41	48	20	2.6	33	43	15	4.7	37	52	19	3.4
Puerperal Fever	7	37	3	3.5	2	25	.05	4.0	7	29	2	2.3	0	0	0	0	16	46	7	3.6
Rheumatism	62	78	51	3.3	83	60	51	3.2	77	66	51	2.4	67	87	60	2.7	81	76	62	2.3
Scarlatina	45	68	32	3.1	9	68	11	3.9	10	28	3	3.0	33	78	26	1.7	19	50	10	3.3
Small-pox	1	25	0.2	4.0	10	0	0	0	3	56	2	2.0	4	25	1	2.0	2	63	1	4.5
Tonsilitis	63	71	47	2.9	59	57	34	3.1	66	60	39	2.7	78	73	58	3.8	66	55	37	2.8
Whooping-cough	37	76	30	2.8	11	42	5	1.8	13	35	13	1.4	11	46	6	2.7	20	45	9	3.2

* For counties in each division see Exhibit I, page 87. b, c, d, e. See foot-notes with these marks in Table 2, page 101.

TABLE 4.—CONCLUDED.

Diseases.	Northern Central Division.*				Bay and Eastern Division.*				Central Division.*				Southwestern Div.*				Southern Central Division.*				Southeastern Div.*			
	Per Cent of Observers Reporting Presence of. b	Av. Per Cent of Weeks Reported Present where Present. c	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence where Present. e	Per Cent of Observers Reporting Presence of. b	Av. Per Cent of Weeks Reported Present where Present. c	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence where Present. e	Per Cent of Observers Reporting Presence of. b	Av. Per Cent of Weeks Reported Present where Present. c	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence where Present. e	Per Cent of Observers Reporting Presence of. b	Av. Per Cent of Weeks Reported Present where Present. c	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence where Present. e	Per Cent of Observers Reporting Presence of. b	Av. Per Cent of Weeks Reported Present where Present. c	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence where Present. e	Per Cent of Observers Reporting Presence of. b	Av. Per Cent of Weeks Reported Present where Present. c	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence where Present. e
Av. for Tab. Dis. Rep. Present.	31	57	18	2.6	27	63	17	3.3	29	64	19	2.8	32	67	22	3.1	30	68	21	3.5	24	58	14	2.5
Brain, Inflammation of	8	27	2	2.0	7	31	2	7.1	13	35	5	4.7	7	33	2	4.3	7	38	3	6.6	3	25	0.7	2.3
Bowels, Inflammation of	16	30	5	3.6	21	46	10	4.0	31	49	16	3.8	19	37	8	3.9	25	54	14	4.5	14	32	5	2.7
Bronchitis	46	66	34	2.2	58	73	42	2.7	69	79	56	2.4	70	78	56	2.8	66	73	49	2.9	61	66	40	2.0
Cerebro-spinal Meningitis	2	33	0.5	2.0	5	26	1	4.8	2	33	0.6	2.0	4	47	2	3.8	1	36	0.5	5.5	3	29	0.9	3.0
Cholera Infantum	30	48	15	3.1	20	60	13	2.8	17	53	9	2.9	25	56	15	3.3	14	57	8	4.7	17	36	7	3.1
Cholera Morbus	22	30	7	2.4	20	59	13	3.3	26	50	14	3.0	25	59	16	3.5	32	58	19	3.5	20	46	9	2.7
Consumption, Pulmonary	42	79	32	3.4	42	85	35	3.9	39	88	35	2.9	49	80	40	3.9	41	88	36	4.3	51	87	44	2.4
Croup, Membranous	8	38	3	3.5	5	28	1	2.0	3	32	1	5.5	10	56	6	5.0	3	53	2	9.1	4	50	2	2.8
Diphtheria	12	39	5	2.2	18	64	12	3.6	11	42	5	2.3	5	37	2	3.0	13	59	8	6.1	6	46	3	1.9
Diarrhea	78	69	54	2.1	51	67	35	2.2	61	68	42	2.4	53	64	35	2.7	59	68	41	3.0	39	54	22	1.8
Dysentery	38	51	19	2.7	21	53	12	3.3	19	48	10	2.9	25	58	16	3.0	28	57	16	4.2	17	53	9	2.7
Erysipelas	22	49	10	3.6	20	39	8	4.2	22	50	12	3.9	37	47	18	4.0	24	40	10	4.1	19	47	9	2.9
Fever, Intermittent	74	69	52	1.9	24	49	12	3.0	35	61	22	3.4	44	76	36	2.8	41	77	32	3.1	30	54	16	2.8
Fever, Remittent	62	48	30	2.6	24	56	14	3.6	28	70	20	2.7	46	76	34	3.5	37	71	27	3.5	30	41	12	2.9
Fever, Typhoid (enteric)	38	58	23	2.4	24	61	15	4.2	11	50	54	2.9	13	46	6	4.7	16	64	11	5.1	10	66	6	1.9
Fever, Typho-malarial	12	32	4	2.5	11	47	5	2.1	4	49	2	3.1	18	42	7	3.6	7	56	4	6.8	5	42	2	3.5
Influenza	34	63	22	2.2	50	73	38	2.1	53	77	42	2.1	67	82	56	2.0	56	74	42	2.4	46	61	29	2.0
Kidney, Inflammation of	36	46	17	2.9	16	38	6	4.0	33	53	18	3.7	25	58	15	4.1	31	55	17	4.5	30	56	17	3.4
Measles	8	31	3	2.3	15	49	7	3.7	13	49	7	1.8	8	57	4	2.9	10	55	5	3.5	16	61	10	1.9
Neuralgia	74	62	47	2.5	68	70	47	2.7	78	78	61	2.4	86	78	67	2.5	80	79	64	2.2	44	60	27	2.5
Pleuritis	22	43	10	3.2	20	40	8	5.0	28	43	13	3.6	25	46	13	3.4	19	46	9	4.3	29	36	11	3.1
Pneumonia	20	60	18	3.2	28	60	17	3.9	34	52	18	3.1	35	61	20	3.7	41	59	25	4.4	30	51	16	3.1
Puerperal Fever	16	58	10	3.9	6	24	2	5.4	1	25	0.3	3.0	10	38	3	3.5	6	37	2	5.0	4	29	1	2.8
Rheumatism	72	61	43	2.5	68	77	53	2.8	80	82	66	2.4	90	88	80	2.5	87	82	72	2.4	64	73	47	2.3
Scarlatina	24	57	14	1.8	22	61	14	4.9	25	47	12	2.6	24	51	12	3.3	24	63	15	4.2	19	70	14	1.3
Small-pox	0	0	0	0	1	29	0.3	6.0	0.4	25	0.1	3.0	0	0	0	0	3	51	2	4.3	0	0	0	0
Tonsilitis	40	54	23	2.3	60	63	32	3.2	65	61	39	2.8	70	64	46	3.0	74	71	53	3.1	50	58	30	2.4
Whooping-cough	20	58	11	2.7	19	73	14	2.7	15	52	8	2.9	15	64	10	3.3	18	67	12	3.9	13	52	7	2.4

* For counties in each division see Exhibit I, page 87. b, c, d, e. See foot-notes with these marks in Table 2, page 101.

DISEASES IN MICHIGAN, ARRANGED IN ORDER OF PREVALENCE, THOSE WHICH CAUSE MOST SICKNESS FIRST.

EXHIBIT A.—*Order of Prevalence of twenty-eight diseases in Michigan, in the period of thirteen years, 1882-1894, and in each of those years, and the average for the twelve years, 1882-1893, judging from the "Per Cent of Reports," which stated the presence of each of the diseases, in connection with the reported "Order of Prevalence" when and where each disease was present. (The method of rating diseases for this Exhibit is described and illustrated in a "Compiling Table" on pages 122 and 123 of the Annual Report for 1890.)*

Order, 1882-93.	Diseases arranged in order of greatest prevalence.	Average Order, 1882-93.	1894.	1893.	1892.	1891.	1890.	1889.	1888.	1887.	1886.	1885.	1884.	1883.	1882.
1	Rheumatism	2	1	1	2	2	1	1	1	1	1	3	2	4	4
2	Neuralgia	2	2	2	1	3	2	2	2	2	2	1	1	2	2
3	Bronchitis	3	3	4	3	4	3	3	3	3	3	4	4	3	3
4	Intermittent Fever	5	8	7	7	8	8	5	4	5	4	2	3	1	1
5	Consumption, Pul.	6	7	8	9	7	6	6	5	4	5	5	5	5	5
6	Diarrhea	6	5	6	5	5	5	4	6	6	7	7	6	6	7
7	Influenza	6	4	3	4	1	4	8	8	8	8	8	9	8	8
8	Tonsillitis	7	6	5	6	6	7	7	7	7	6	6	7	7	9
9	Remittent Fever	9	9	9	8	9	9	9	9	9	9	9	8	9	6
(10)	(The Average Disease)	10	9	10	9	10	9	10	11	11	10	10	10	11	11
10	Pneumonia	11	16	12	11	13	10	10	10	10	10	10	10	10	10
11	Inflammation of Kidney	14	17	16	12	14	15	14	16	15	13	12	11	-----	-----
12	Erysipelas	14	21	21	21	19	15	12	11	11	11	11	12	12	15
13	Cholera morbus	14	12	13	14	12	12	15	15	12	14	15	15	15	16
14	Whooping-cough	14	19	11	10	10	13	11	20	19	12	13	13	19	13
15	Dysentery	15	13	17	17	17	14	13	13	13	15	19	14	13	17
16	Typho-malarial Fever	17	23	22	22	20	19	17	14	14	16	14	17	14	12
17	Measles	17	11	10	16	11	11	22	12	16	22	25	23	11	20
18	Pleuritis	18	22	20	19	18	18	16	17	-----	-----	-----	-----	-----	-----
19	Cholera infantum	19	15	15	15	15	17	18	18	18	17	18	18	17	19
20	Diphtheria	19	19	18	18	23	23	24	23	20	19	16	20	18	11
21	Scarlet Fever	19	14	19	13	22	22	21	22	23	20	20	19	16	14
22	Inflammation of Bowels	20	20	23	23	21	21	19	19	17	18	17	21	20	21
23	Typhoid Fever (enteric)	20	18	14	20	16	20	20	21	21	21	21	22	21	18
24	Puerperal Fever	23	24	24	26	25	24	23	24	23	24	24	16	24	22
25	Inflammation of Brain	25	28	26	25	26	27	27	27	24	23	22	24	22	23
26	Membranous croup	25	27	25	27	24	25	26	26	25	25	28	26	23	25
27	Cerebro-spi. meningitis	26	25	27	24	27	26	25	25	26	26	26	25	25	24
28	Small-pox	27	26	28	28	28	28	28	28	27	27	27	27	26	26

DISEASES WHICH CAUSE MOST SICKNESS IN MICHIGAN.

This is shown in this Report in Exhibit A, and more specifically in Exhibit VI., in this Report, and in similar exhibits in previous Reports. The question is differently answered in different years. For many years after the compilation of weekly reports was begun, intermittent fever appeared to be the leading cause of sickness in Michigan.

By exhibit A, one may see that in the years 1881-3 intermittent fever, in the years 1884–5 neuralgia, in the years 1886–90 rheumatism, in 1891 influenza, in 1892 neuralgia, and in 1893–94 rheumatism appear to have caused most sickness in Michigan. This does not necessarily imply that there was an increase in rheumatism or neuralgia, because one disease *may* exhibit a higher relative order of prevalence on account of some other disease or diseases having been actually lessened in prevalence.

The "Average Disease" of those reported, is included in Exhibit A, as a standard by which to judge the fluctuations. It may be seen that in 1890, the "Average Disease" was higher (9) by one-tenth, than the average (10) of a long series of years; in 1891 it was lowered to the average; in 1892 it was again higher by one-tenth than the average; in 1893 it was again lowered to the average, and in 1894 it was again one-tenth higher.

In this connection it should be stated that the average number of diseases reported on each card has gradually decreased for the past ten years. This is shown in Exhibit B, as follows:—

EXHIBIT B.—*Stating for each of the eleven years 1884–1894, the number of card reports received, the total number of disease reports and the average number of diseases reported on each card; also the averages for the 10 years, 1884–1893.*

Year.	Number of card reports received.	Number of disease reports.	Av. number of diseases on each card.
1884	3,957	31,466	7.91
1885	5,108	35,752	7.00
1886	5,583	38,640	6.92
1887	4,896	33,043	6.75
1888	5,047	33,270	6.59
1889	5,000	32,612	6.52
1890	4,989	33,984	6.87
1891	4,291	28,741	6.70
1892	5,281	31,269	5.92
1893	5,853	32,723	5.59
Av. for the 10 years, 1884-1893	4,996	33,146	6.68
1894	5,572	30,619	5.50

In 1890 rheumatism, neuralgia, bronchitis and influenza in order named, headed the list. In 1891 influenza, rheumatism, neuralgia and bronchitis, headed the list. In 1892 neuralgia, rheumatism, bronchitis and influenza headed the list. In 1893 rheumatism, neuralgia, influenza and bronchitis and in 1894 rheumatism, neuralgia, bronchitis and influenza in order named, appear to have caused most sickness in Michigan.

Nearly the same diseases appear above the average line each year. Pneumonia has appeared in this exhibit tenth in order for eleven years in succession, ending with 1890, and dropped to thirteenth in 1891, rising in 1892, to eleventh and dropped in 1893 to twelfth and in 1894 to sixteenth in order. Some of the diseases of minor importance vary considerably in their order. Whooping-cough, for example, in 1883 was nineteenth in order, and rose to twelfth in order in 1886, dropped to nineteenth in 1887, to twentieth in 1888, and rose to eleventh in 1889, dropped to thirteenth in 1890, and was tenth in 1891 and 1892, eleventh in 1893 and rose to tenth in 1894.

Exhibit VII. supplies data relative to what diseases caused most sickness in 1894 in each of several geographical divisions of Michigan. It may be seen that there is evidence that there are very great differences in the different parts of the State. Further evidence is very desirable, however, in order to reach conclusions on this important subject. The exhibit will be found of great interest to those who study it carefully, and in connection with previous reports.

The lines for 1894 in Exhibit XIII., are graphically represented in Diagrams 1, page 89; 2, page 125; 3, page 127, and 4 on a subsequent page.

EXHIBIT VI.—*Diseases from which there seems to have been the Most Sickness in Michigan in 1894, as indicated by the Per Cent of Weekly Reports Stating Presence of the Diseases, as studied in connection with the Average Order of Prevalence of said Diseases when Reported Present; also Order, Per Cent of Reports and Average Order for the same Diseases in 1893, 1892, 1891, and 1890.*

	1894.				1893.			1892.			1891.			1890.		
	Order.*	Diseases in Order of Apparent Amount of Sickness in 1893. Most Prevalent Disease First.	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence when present. e	Order.*	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence when Present. e	Order.*	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence when Present. e	Order.*	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence when Present. e	Order.*	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence when Present. e
More sickness than Average for 28 Diseases.	1	Rheumatism	62	2.6	1	64	2.6	2	64	2.7	2	69	2.9	1	71	2.9
	2	Neuralgia	56	2.5	2	57	2.5	1	61	2.5	3	66	2.8	2	67	2.7
	3	Bronchitis	50	2.6	4	53	2.5	3	54	2.6	4	60	2.7	3	65	2.6
	4	Influenza	41	2.2	3	43	2.0	4	42	2.1	1	55	2.0	4	53	2.2
	5	Diarrhea	40	2.5	6	40	2.6	5	43	2.6	5	47	2.7	5	44	2.9
	6	Tonsillitis	42	3.0	5	49	2.8	6	48	2.9	6	49	3.3	7	50	3.4
	7	Consumption, Pul.	36	3.4	8	38	3.5	9	38	3.7	7	49	3.8	6	52	3.5
	8	Intermittent Fever	24	2.9	7	24	2.9	7	27	3.0	8	36	3.2	8	41	2.9
	(9)	Average	20	3.0	(10)	20	3.3	(9)	21	3.1	(10)	25	3.3	(9)	25	3.3
Less than said Average.	9	Remittent Fever	20	3.1	9	18	2.9	8	21	2.9	9	28	3.3	9	27	3.2
	10	Whooping-cough	12	2.9	11	9	3.0	10	10	3.0	10	9	2.9	13	9	3.2
	11	Measles	6	2.8	10	7	2.8	16	4	3.3	11	10	3.0	11	12	3.0
	12	Cholera Morbus	14	3.3	13	14	3.3	14	15	3.4	12	16	3.4	12	15	3.5
	13	Dysentery	14	3.3	17	13	3.6	17	15	3.8	17	16	3.8	14	16	3.8
	14	Scarlet Fever	14	3.3	19	10	3.6	13	12	3.2	22	9	4.2	22	10	4.2
	15	Cholera Infantum	12	3.3	15	10	3.4	15	11	3.6	15	13	3.6	17	10	3.5

* Judging from the per cent of reports which stated presence of the diseases in connection with the order of prevalence when present. The method of rating diseases, as causes of sickness, as shown in Exhibits VI. and VII., is fully described and illustrated by a "Compiling table" on pages 122 and 123 of the Annual Report for the year 1890.

d This column states what per cent the number of reports stating presence of a disease is of the whole number of reports received for the time specified, from *all observers* in the State. It combines and states in a general way, an idea of the *time* a disease was prevalent, with an idea of the area of its prevalence.

e The disease having the greatest number of cases was to be marked 1, in the order; the disease having the next greatest number of cases 2; and so on. Diseases not present were to be marked 0. The numbers in this column are found by dividing the totals of the Order of Prevalence columns, in Table 3 (omitted in this report), by the number of men who reported the disease present. The column is, therefore, an average, not for all the localities represented, but only for those at which the given disease was reported present. The numbers in the "Average" lines for this column are found by dividing the sum of the totals in the Order of Prevalence columns, in Table 3, for all diseases reported present, by the sum of the numbers of men who reported the different diseases present, thus counting each man once for every disease he reported present. As a rule, small numbers in this column indicate the large prevalence of the disease, and *vice versa*; but the greater the number of diseases reported present by each observer, from week to week, the greater will be the average in this column.

EXHIBIT VII.—*In each of Eleven Geographical Divisions* of the State, the Fifteen Diseases from which there seems to have been the Greatest Amount of Sickness in 1894, as indicated by the Per Cent of Weekly Reports Stating Presence of each of 28 Leading Diseases, when Studied in connection with the Average Order of Prevalence of said diseases when reported present.*

	Order.†	Diseases in Order of Apparent Amount of Sickness. Most Prevalent Disease First.	Per Cent of Reports stating Presence of.d	Av. Order of Prevalence when Pres. e	Diseases in Order of Apparent Amount of Sickness. Most Prevalent Disease First.	Per Cent of Reports stating Presence of.d	Av. Order of Prevalence when Pres. e	Diseases in Order of Apparent Amount of Sickness. Most Prevalent Disease First.	Per Cent of Reports stating Presence of.d	Av. Order of Prevalence when Pres. e
		UPPER PEN'LAR DIV.*			NORTHWESTERN DIV.*			NORTHERN DIVISION.*		
More Sickness than Average for 28 Diseases.	1	Bronchitis	57	2.6	Diarrhea	54	2.1	Bronchitis	68	2.0
	2	Diarrhea	45	2.5	Bronchitis	56	2.5	Influenza	37	2.0
	3	Neuralgia	51	3.0	Neuralgia	58	3.1	Rheumatism	51	2.4
	4	Tonsillitis	47	2.9	Influenza	37	2.1	Whooping-cough	12	1.4
	5	Rheumatism	51	3.3	Rheumatism	51	3.2	Diarrhea	41	2.3
	6	Influenza	42	2.8	Intermittent Fever	32	2.7	Neuralgia	48	2.5
	7	Consumption, Pul.	52	3.4	Tonsillitis	34	3.1	Diphtheria	20	1.9
	8	Whooping-cough	30	2.8	Whooping-cough	5	1.8	Tonsillitis	39	2.7
	9	Typhoid Fev. (ent.)	32	3.0	Diphtheria	2	1.8	Cholera Infantum	12	2.2
	10	Scarlet Fever	32	3.1	Remittent Fever	10	2.3	Typho-mal. Fever	2	2.0
	11	Remittent Fever	1	1.3	Inflam. of Kidney	16	2.8	Measles	2	2.0
	(12)				Average	19	3.0			
Less than said Average.	12	Measles	4	1.9	Cerebro-spi. Men.	1	2.0	Small-pox	2	2.0
	(13)	Average	23	3.4						
	13	Pneumonia	31	3.9	Cholera Infantum	13	2.7	Cerebro-spi. Men.	.04	2.0
	(14)							Average	18	2.5
	14	Cholera Infantum	23	3.7	Dysentery	23	3.3	Pneumonia	20	2.6
	15	Inflam. of bowels	15	3.4	Cholera Morbus	21	3.4	Consumption, Pul.	13	2.5
		NORTHERN CEN. DIV.*			WESTERN DIVISION.*			NORTHEASTERN DIV.*		
More Sickness than Av. for 28 Diseases in 1894.	1	Intermittent Fever	52	1.9	Neuralgia	60	2.1	Influenza	59	1.6
	2	Diarrhea	54	2.1	Rheumatism	62	2.3	Neuralgia	54	1.8
	3	Neuralgia	47	2.5	Influenza	45	1.9	Rheumatism	60	2.7
	4	Rheumatism	43	2.5	Diarrhea	45	2.2	Bronchitis	60	2.9
	5	Bronchitis	32	2.2	Intermittent Fever	32	2.2	Scarlet Fever	26	1.7
	6	Scarlet Fever	14	1.8	Bronchitis	40	2.8	Tonsillitis	58	3.8
	7	Influenza	22	2.2	Tonsillitis	37	2.8	Diarrhea	37	2.9
	8	Tonsillitis	23	2.3	Consumption, Pul.	32	2.7	Diphtheria	21	2.3
	9	Remittent Fever	30	2.6	Inflam. of Kidney	28	2.8	Inflam. of Kidney	48	4.0
	(10)				Average	21	2.7	Average	25	3.1
Less than said Average.	10	Typhoid Fev. (ent.)	23	2.4	Whooping-cough	9	2.2	Small-pox	1	2.0
	(11)	Average	18	2.6						
	11	Inflam. of Brain	2	2.0	Dysentery	21	2.8	Erysipelas	37	3.9
	12	Dysentery	19	2.7	Remittent Fever	24	3.0	Cholera Infantum	6	2.5
	13	Cerebro-spi. Men.	0.5	2.0	Cholera Infantum	11	2.6	Measles	3	2.5
	14	Diphtheria	5	2.2	Cholera Morbus	10	2.6	Whooping-cough	6	2.7
	15	Cholera Morbus	7	2.4	Measles	9	2.6	Pleuritis	36	4.3

* The counties in each division are stated in Exhibit I., page 87.

† Judging from the per cent of reports in connection with the "average order of prevalence where present."

d, e. Foot-notes with these marks are on page 101.

EXHIBIT VII.—CONTINUED.

	Order.†	Diseases in Order of Apparent Amount of Sickness. Most Prevalent Disease First.	Per Cent of Reports stating Presence of d	Av. Order of Prevalence when Pres. e	Diseases in Order of Apparent Amount of Sickness. Most Prevalent Disease First.	Per Cent of Reports stating Presence of d	Av. Order of Prevalence when Pres. e	Diseases in Order of Apparent Amount of Sickness. Most Prevalent Disease First.	Per Cent of Reports stating Presence of d	Av. Order of Prevalence when Pres. e
		BAY AND EASTERN DIV.*			CENTRAL DIVISION *			SOUTHWESTERN DIV.*		
More Sickness than Av. for 28 Diseases.	1	Rheumatism	53	2.8	Rheumatism	66	2.4	Rheumatism	80	2.5
	2	Neuralgia	47	2.7	Neuralgia	61	2.4	Influenza	56	2.0
	3	Influenza	38	2.1	Bronchitis	56	2.4	Neuralgia	67	2.5
	4	Bronchitis	42	2.7	Influenza	42	2.1	Bronchitis	56	2.8
	5	Diarrhea	35	2.2	Typhoid Fev. (ent.)	54	2.9	Tonsillitis	46	3.0
	6	Tonsillitis	39	3.2	Diarrhea	42	2.4	Diarrhea	35	2.7
	7	Consumption, Pul.	35	3.9	Tonsillitis	39	2.8	Intermittent Fever	36	2.8
	8	Whooping-cough	14	2 7	Consumption, Pul.	35	2.9	Remittent Fever	36	3.5
	(9)							Average	22	3.1
Less.	9	Cholera Infantum	13	2 8	Measles	7	1.8	Consumption, Pul.	40	3.9
	10	Typho-mal Fever	5	2.1	Remittent Fever	20	2.7	Dysentery	16	3.0
	(11)	Average	17	3.3	Average	19	2.8			
	11	Intermittent Fever	12	3.0	Scarlet Fever	12	2.6	Cholera Infantum	15	3.3
	12	Membranous Croup	1	2.0	Cerebro-spi. men.	0.6	2.0	Measles	4	2.9
	13	Cholera Morbus	18	3.3	Diphtheria	5	2.3	Scarlet Fever	12	3.3
	14	Dysentery	12	3 3	Pneumonia	18	3.1	Cholera Morbus	16	3.5
	15	Remittent Fever	14	3.6	Intermittent Fever	22	3.4	Pleuritis	13	3.4
		SOUTH'N CENTRAL DIV.*			SOUTHEASTERN DIVISION.*					
More Sickness than Av. for 28 Diseases.	1	Rheumatism	72	2.4	Rheumatism				47	2.3
	2	Neuralgia	64	2.2	Bronchitis				40	2.0
	3	Tonsillitis	53	3.1	Consumption, Pul.				44	2.4
	4	Bronchitis	49	2.9	Influenza				29	2.0
	5	Influenza	42	2 4	Scarlet Fever				14	1.3
	6	Diarrhea	41	3.0	Diarrhea				22	1.8
	7	Intermittent Fever	32	3.1	Tonsillitis				30	2.4
	8	Consumption, Pul.	36	4.3	Neuralgia				27	2.5
	9	Remittent Fever	27	3 5	Measles				10	1.9
	(10)	Average	21	3.5						
Less.	10	Cholera Morbus	19	3 5	Typhoid Fever, (Enteric)				6	1.9
	11	Pneumonia	25	4.4	Diphtheria				3	1.9
	(12)				Average				14	2.5
	12	Scarlet Fever	15	4.2	Whooping-cough				7	2.4
	13	Dysentery	16	4.2	Intermittent Fever				16	2.8
	14	Whooping-cough	12	3.9	Inflammation of Brain				0.7	2.3
	15	Inflam. of Kidney	17	4.5	Cholera Morbus				9	2.7

*The counties in each division are stated in Exhibit I., page 87.

†Judging from the per cent of reports in connection with the "average order of prevalence where present."

d, e. Foot-notes with these marks are on page 101.

EXHIBIT VIII.—*Names of Stations where were made the Observations of Meteorological Conditions used in Exhibit X., and following Exhibits; relative to Sickness and Meteorological Conditions in 1894, also the Temperature, Humidity, Cloudiness, Ozone, Velocity of Wind and Atmospheric Pressure, at each Station for which Observations of the given condition are included in the summary statement relative to that condition in said exhibit.*

Stations.* (Those of the U. S. Signal Service in Italics.)	Temperature.		Humidity.		Per Cent of Cloudiness.	Ozone.		Wind, Av. Velocity.	Atmospheric Pressure.		
	Average Daily Range.	Average.	Relative.	Absolute.		Day.	Night.		Range. Monthly.	Range. Average Daily.	Average.
Number of Stations included in Average	16	11	7	7	9	9	9	8	9	10	10
Average	17.84	48.49	75	3.61	54	3.95	4.31	10.1	.840	.263	29.053
Marquette	14.22							10.6			
Sault Ste. Marie	16.68							8.5			
Traverse City	19.85	47.20	79	3.53	60	6.73	6.54		.948	.214	29.304
Alpena	14.59							9.9			
Harrisville	19.24	44.15			64	3.07	3.29				
Grand Haven	14.63							10.9			
Port Huron	15.98							11.7			
Thornville	17.40	50.32	73	3.60	47	3.25	4.75		.853	.205	28.938
Agricultural College	23.12	48.58	78	3.79	56				.779	.174	29.038
Lansing, S. B. of H.	19.12	49.00	70	3.42	59	2.82	3.22	10.3	.853	.198	29.077
Ann Arbor	17.75	49.49	79	3.62	53	3.22	2.99	7.6	.831	.193	29.035
Kalamazoo	17.93										
Tecumseh	19.19	48.68	73	3.58	44	4.74	5.58		.811	.186	29.151
Birmingham	20.14	49.95	74	3.73	59				.840	.199	29.107
Detroit	15.41							11.0			
Battle Creek		51.83			44	3.38	2.70		.823	.223	29.110
Rockland		44.26				5.54	6.14			.240	28.635
Adrian	20.10	49.95				2.58	3.22		.880	.196	29.134

*Observations of range of temperature were made with registering thermometers read and set at the Signal Service Stations as follows:—the maximum at the morning observation, the minimum at the evening observation, at 9 P. M. at Ann Arbor, and at 7 A. M. at other stations. For the ozone observations, the test-paper was exposed from 7 A. M. to 2 P. M. for the day observations, and from 9 P. M. to 7 A. M. for the night observations. The velocity of wind was recorded by registering anemometers. These subjects are treated by months in 1894 and for previous years, in an article on Meteorological Conditions in Michigan in 1894, on pages 1-80 of this Report.

EXHIBIT IX.—*Showing Comparisons between the Averages of certain Meterological Conditions at Stations in Michigan in 1894, with those in preceding Years. (Abstracted from Exhibit 9, page 18; Exhibit 13, page 24; Exhibit 17, page 30; Exhibit 19, page 31; Exhibit 28, page 46; Exhibit 32, page 55; Exhibit 24 page 44; Exhibit 30, page 54; Exhibit 31, page 54, and Exhibit 35, page 71 of this Report.)*

Meteorological Conditions.		Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Average Temperature	In 1894 higher than Av. for 17 years, 1877-93	2.38	6.18		9.25	2.65		4.37	2.65	.78	3.32	.68		3.59
	Lower			1.26			.49						3.12	
Av. Daily Range of Temp	In 1894 greater than Av. for 15 years, 1879-93							2.38	2 27	2.94	.50			
	Less	.17	1.39	.43	.77	1.34	2.07					1.43	1.54	1.19
Absolute Humidity	In 1894 more than Av. for 17 years, 1877-93	.17	.34		.72	.35	.26	.57			.44	.06		.18
	Less			.15					.17	.30			.29	
Relative Humidity	In 1894 more than Av. for 16 years, 1878-93					3	7					2	0	
	Less	2	1	2	2			3	9	5	2		0	2
Rainfall	In 1894 more than Av. for 17 years, 1877-93						3.06				.02			
	Less	6.72	.46	.93	.18	.14		1.15	1.81	2.41		.18	1.15	1.11
Velocity of Wind	In 1894 more than Av. for 13 years, 1882-93	.5	0	1.0	2.0		1.1	0	.4		.1	.2	1.3	.3
	Less		0			.7		0		.3				
Cloudiness	In 1894 more than Av. for 17 years, 1877-93					2	10			1		7	4	
	Less	2	2	8	3			7	11		3			12
Day Ozone	In 1894 more than Av. for 17 years, 1877-93	.53	.78	.97	.87	.69	.97	.37	.31	.89	.23	.30	.21	.06
	Less													
Night Ozone	In 1894 more than Av. for 17 years, 1877-93	.75	.27	.61	.42	.71	1.22	1.09	1.13	1.19	.76	.44	.45	.42
	Less													
Atmospheric Pressure	In 1894 more than Av. for 17 years, 1877-93													
	Less	.089	.087	.083	.096	.059	.104	.060	.054	.060	.098	.204	.092	.069

CLIMATE AND SICKNESS.*

Exhibit X., page 123 (and similar exhibits in previous Reports) is an attempt to learn something of the relations of bronchitis to meteorological conditions, by noting whether each meteorological condition was above or below its average for the year, in months when more or in months when less bronchitis than the average for the year was reported. The months are arranged in order according to the prevalence of bronchitis; those months in which most bronchitis was reported being placed first in the column; those in which more bronchitis than the average was reported are placed above the average line, the others below that line. The meteorological conditions for each month are printed, in the proper columns, in the line for the month. The statements being thus arranged, it is easy to see whether the temperature, the velocity of the wind, or any other condition represented, was above its annual average in months when more than the average amount of bronchitis was reported, or *vice versa*.

That the comparisons may the more readily be held in mind, propositions have been made concerning the relations of bronchitis to meteorological conditions, grouping the conditions into two classes. The letters *a* and *b* in the Exhibit mark, exceptions to these propositions. It is not supposed that the propositions are in every case true concerning every disease; but the propositions serve to bring out the evidence of the exhibit on the subject in question. This evidence is appreciated by noting the number and force of the exceptions to the propositions, and also whether the exception is explained by facts shown in other columns. A summary of the evidence is presented in Exhibit XXV., near the close of this article.

Exhibits and propositions similar to those relative to bronchitis, but relating to other diseases, are given on following pages. The propositions are differently stated for the summer diseases (beginning with the exhibit on diarrhea) and for the winter diseases (beginning with that on bronchitis), but they are not changed to fit the individual diseases under each class.

RELATIONS OF BRONCHITIS TO METEOROLOGICAL CONDITIONS.

PROPOSITION 1.—That in months when **more** than the average per cent of weekly reports stated the presence of bronchitis, the relative humidity of the atmosphere, the average per cent of cloudiness, the ozone, the average velocity of the wind, the monthly and the average daily range of the barometer, were **greater** than the average for the year; and in months when **less** than the average per cent of reports stated the presence of bronchitis, these conditions were **less** than the average for the year. In Exhibit X, page 123, the letter *a* marks exceptions to this proposition for the year 1894.

PROPOSITION 2.—That in months when **more** than the average per cent of weekly reports stated the presence of bronchitis, the average daily temperature, the average daily range of temperature†, the absolute humidity of the atmosphere and the average daily pressure of the atmosphere† were **less** than the average for the year; and in months when **less** than the average per cent of reports stated the presence

* The remarks under this head are applicable, also, by changing the name of the diseases to diseases treated in Exhibits XII., XIV., XV. XVI. and XVII., on the following pages. The meteorological data are from places indicated in Exhibit VIII., page 118.

† The statements relative to the average daily range of temperature and the average daily pressure of the atmosphere were taken from Proposition 1 and inserted in Proposition 2 in the statistical study of sickness in Michigan in 1893, Annual Report for 1894.

of bronchitis these conditions were **greater** than the average for the year. In Exhibit X., page 123, the letter *b* marks exceptions to this proposition for months in 1894.

PROPOSITION 3.—For those months which are not, as regards the absolute humidity of the atmosphere, exceptions to Proposition 2, it is true also that the quantity of vapor inhaled daily was **less** than the average, and the quantity exhaled daily in excess of that inhaled was **greater** than the average in months when **more** than the average per cent of reports stated presence of bronchitis; and that **more** vapor was inhaled and a **less** excess exhaled daily in months when the per cent of reports stating presence of bronchitis was **less** than the average.

Proposition 3 also holds true in relation to pneumonia, membranous croup, diphtheria, tonsillitis, influenza, scarlet fever, rheumatism, neuralgia, pleuritis and pulmonary consumption, treated in Exhibits XII., XIV., XV., XVI. and XVII., on following pages.

What per cent of weekly reports received in 1894 stated presence of bronchitis is graphically represented by months in Diagram 1, page 89.

The evidence of Exhibit X. confirms that of similar exhibits relating to bronchitis in previous years.

What per cent of the reports received stated presence of bronchitis by months in each of the years 1877–94; also the averages for 1877–93 and 1886–93, and a comparison of 1894, with those averages are shown in Exhibit XI., page 122.

RELATIONS OF PNEUMONIA AND OTHER "COLD WEATHER" DISEASES TO METEOROLOGICAL CONDITIONS.

PROPOSITION 1.—That in months when **more** than the average per cent of weekly reports stated the presence of pneumonia (or of membranous croup, diphtheria, tonsillitis, influenza, scarlet fever, rheumatism, neuralgia, pleuritis, pulmonary consumption or average disease), the relative humidity of the atmosphere, the average per cent of cloudiness, the ozone, the average velocity of the wind and the monthly and the average daily range of the barometer, were **greater** than the average for the year; and in months when **less** than the average per cent of the reports stated the presence of pneumonia (or of the other diseases named), these conditions were **less** than the average for the year. In Exhibits XII.–XXVIII., on page 124 and the following pages, the letter *a* marks exceptions to this proposition for the year 1894.

PROPOSITION 2.—That in months when **more** than the average per cent of weekly reports stated the presence of pneumonia (or of membranous croup, diphtheria, tonsillitis, influenza, scarlet fever, rheumatism, neuralgia, pleuritis, pulmonary consumption, or average disease), the average daily temperature, the average daily range of temperature*, the absolute humidity of the atmosphere, and the average daily pressure of the atmosphere*, were **less** than the average for the year; and in months when **less** than the average per cent of reports stated the presence of pneumonia (or of the other diseases named), these conditions were **greater** than the average for the year. In Exhibits XII.–XXVIII., on page 124 and following pages, the letter *b* marks exceptions to this proposition for the year 1894.

* The statements relative to the average daily range of temperature and the average daily pressure of the atmosphere were taken from Proposition 1 and inserted in Proposition 2 in the statistical study of sickness in Michigan in 1893, Annual Report for 1894.

What per cent of the weekly reports received in 1894 stated presence of pneumonia is graphically represented by months in Diagram 1, page 89. What per cent of weeky reports received stated presence of pneumonia, and of the other diseases mentioned in the two preceding propositions by months in the years 1893 and 1894, is stated in Exhibit XIII., page 126, where are also given an average for the seventeen years, 1877–1893, also for the eight years, 1886–1893, and a comparison of 1894 with those averages.

From Exhibit XIII., it may be seen that pneumonia was consideraby less in 1894 than the average for seventeen years, 1877–1893, and also less in each month of 1894, than for the corresponding months of the seventeen years, 1877–1893.

The average temperature was slightly higher in 1894, than the average for the seventeen years, 1877–1893. It was also higher in each month of 1894, except in February, May and November, than the average in corresponding months in the seventeen years, 1877–1893.

The absolute humidity was slightly more in 1894, than the average for the seventeen years, 1877–1893. It was also more in each month of 1894, except February, July, August and November, than the average in corresponding months in the seventeen years, 1877–1893.

The relative humidity was less for the year, and each month of the year 1894, except April, May and October, than the average for the sixteen years, 1878–1893. In November it was the same.

EXHIBIT XI.—Sickness from Bronchitis, 1877-94.—*By Year and Months for each of the seventeen Years, 1877–93, and for 1894, and an average for the seventeen years, 1877–93, also for the eight years, 1886–1893; Stating on what per cent of the Weekly Reports received Bronchitis was reported present, and comparing the Per Cents of 1894, with the Averages for corresponding months in those Years.*

Years, Etc.	Annual Av.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Average 17 years, 1877-93	60	74	75	74	70	61	51	43	41	47	54	64	69
Average 8 years, 1886-93	58	70	72	71	68	60	49	42	40	46	54	61	66
1877	55	76	72	72	65	45	31	25	22	37	48	71	77
1878	64	77	75	74	71	65	56	41	45	55	60	73	81
1879	64	83	87	83	78	65	54	40	41	50	59	65	77
1880	64	81	84	82	68	59	57	44	45	46	57	67	72
1881	62	86	86	80	78	62	53	38	37	44	44	68	68
1882	65	73	70	75	74	70	62	51	44	57	59	71	71
1883	66	77	80	82	76	70	62	56	53	53	57	61	69
1884	61	71	71	71	65	59	56	49	47	50	56	69	70
1885	56	73	74	76	73	56	52	44	39	45	51	58	64
1886	58	71	69	71	65	57	45	40	37	41	51	61	65
1887	55	67	69	67	62	57	49	41	38	47	57	57	61
1888	59	63	76	74	68	63	55	41	39	49	59	59	65
1889	58	65	68	69	68	61	50	49	44	51	57	64	62
1890	65	71	74	76	74	66	56	50	52	54	63	73	79
1891	60	81	79	81	76	64	48	43	36	44	48	57	68
1892	54	72	70	64	67	56	47	37	38	42	50	57	63
1893	53	67	67	62	64	54	42	35	34	39	48	61	62
1894	50	63	60	61	58	49	42	32	35	43	52	53	57
In 1894 Less than Average 1877-93	10	11	15	13	12	12	9	11	5	4	2	11	12
In 1894 Less than Average 1886-93*	8	7	12	10	10	11	7	10	4	3	2	8	9

*This comparison is made because of change of plan of reports in May, 1885, as explained on pages 82-83.

EXHIBIT X.—BRONCHITIS.—*Stating for the Year and for each Month of the Year 1894, what Per Cent of the Weekly Reports of Sickness Stated Presence of Bronchitis and what were the Meteorological Conditions as observed at Stations in Michigan.**

	Months in Order of Greatest Per Cent of Weekly Reports Stating Presence of.	Bronchitis. Per Cent of Weekly Reports Stating Presence of.	Bronchitis. Av. Order of Prevalence where present. †, ‡.	Temperature, F. Av. Daily Range by Registering Thermometers.	Temperature, F. Average of Three Daily Observations.	Humidity of Air. Av. of 3 Daily Observations. § Relative Per Cent of Saturation.	Humidity of Air. Av. of 3 Daily Observations. § Absolute, — Grains of Vapor in a Cubic Foot of Air.	Vapor Inhaled and Exhaled from the Air Passages by one Person in 24 Hours, Troy Ounces. Inhaled. ‖	Vapor Inhaled and Exhaled from the Air Passages by one Person in 24 Hours, Troy Ounces. Exhaled in excess of that Inhaled. ¶	Average Per Cent of Cloudiness.	Ozone, Relative. Scale of 10°. Day Observation, 7 A. M. to 2 P. M.	Ozone, Relative. Scale of 10°. Night Observation, 9 P. M. to 7 A. M.	Av. Velocity of Wind, Miles per Hour by Anemometer.	Atmospheric Pressure, Inches. Reduced to 32° F. Range. Monthly and for year.	Atmospheric Pressure, Inches. Reduced to 32° F. Range. Av. Daily, by 3 Daily Observations. **	Atmospheric Pressure, Inches. Reduced to 32° F. Average Pressure.
More than Av. Per Cent of Bronchitis.	Jan.	63	2.4	14.45	27.19	82	1.77	1.11	10.57	68	4.33	a 4.21	10.8	1.750	.293	b29.076
	Mar.	61	2.3	16.65	38.70	77	2.52	1.58	10.10	55	4.80	4.62	12.4	a .799	.221	29.042
	Feb.	60	2.5	16.90	22.37	81	1.40	.88	10.80	57	4.68	4.86	11.7	1.447	.290	b29.087
	April	58	2.5	b17.86	46.90	a 73	3.12	1.95	9.78	54	4.23	4.62	a 9.8	.886	.217	b29.064
	Dec	57	2.3	12.03	31.40	81	1.98	1.24	10.44	63	a 3.51	a 4.23	11.4	.947	.244	b29.082
	Nov.	53	2.4	12.59	33.09	80	2.04	1.28	10.40	73	a 3.41	a 3.87	12.0	1.150	.267	b29.060
	Oct.	52	2.4	15.76	b50.14	78	3.59	2.21	9.41	61	a 3.46	a 3.70	a 9.7	a .752	.230	28 961
Av.		50	2 6	17.84	48.49	75	3.61	2 26	9.42	54	3.95	4.31	10.1	.840	.203	29.053
Less than Av. Per Cent of Bronchitis.	May	49	2.6	18.20	55.24	a 76	4.16	2.60	9.08	a 60	a 4.60	a 5.03	a 10.5	a .873	.172	b28.995
	Sept.	43	3.2	20.53	64.45	74	5.32	3.33	8.35	41	3.37	3.67	9.1	.680	.155	29.089
	June	42	2.4	22.70	70.37	70	6.07	3.79	7.89	41	3.32	a 4.64	7.8	.644	.121	b29.035
	Aug.	36	3.1	23.16	68.74	68	5.43	3.39	8.29	43	a 4.21	4.16	7.3	.465	.114	29.082
	July	32	2.9	23.15	73.31	69	5.90	3.69	7 99	29	3.33	4.07	8.2	.411	.109	29.063

a An exception to the proposition that more than the average per cent of weekly reports stated presence of bronchitis in months when the meteorological condition named at the head of the column was greater than the average for the year; and less in months when the same condition was less than the average. See proposition 1, relating to bronchitis, page 120.

b An exception to the proposition that more than the average per cent of weekly reports stated presence of bronchitis in months when the meteorological condition named at the head of the column was less than the average for the year and less in months when the same condition was greater than the average for the year. See proposition 2, relating to bronchitis, page 120.

* How many stations, and what stations are represented in the statements for each meteorological subject may be seen by referring to Exhibit VIII., page 118, in which the stations are named, and a statement for the year 1894, in relation to each meteorological subject, is given for each station included in the average for that subject. In Exhibit VIII., is also stated what time the tri-daily observations were made at each station. Additional statements relative to meteorological conditions may be found in an article on the Principal Meteorological Conditions in Michigan in 1894, on pages 1-80 of this Report.

† Explanations of statements in these columns, and other statements relative to the prevalence, in 1894, of the diseases under consideration may be found in Tables 2, pages 100-109, and 4, pages 110-111, of this Report, and also in Diagrams 1 (p. 89), 2, 3, 4 and 5, on following pages. When the per cent of reports stated for any disease is the same for two months or for any month is the same as the average, the order of months in the first column of these exhibits has been determined by reference to fractional per cents.

‡ Small numbers in this column indicate great prevalence in the localities where the disease occurred, as compared with other diseases; and large numbers a less prevalence.

§ Calculated from readings of dry bulb and wet bulb thermometers.

‖ Calculated for 18 respirations per minute, of 20 cubic inches of air each.

¶ Assuming the air exhaled to be saturated with vapor at the temperature of 98° F., in which case each cubic foot of air contains 18.69 grains of vapor, and 18 respirations per minute, of 20 cubic inches of air each, make 11.68 Troy ounces of vapor exhaled daily. No correction has been made for expansion of air after it is inhaled.

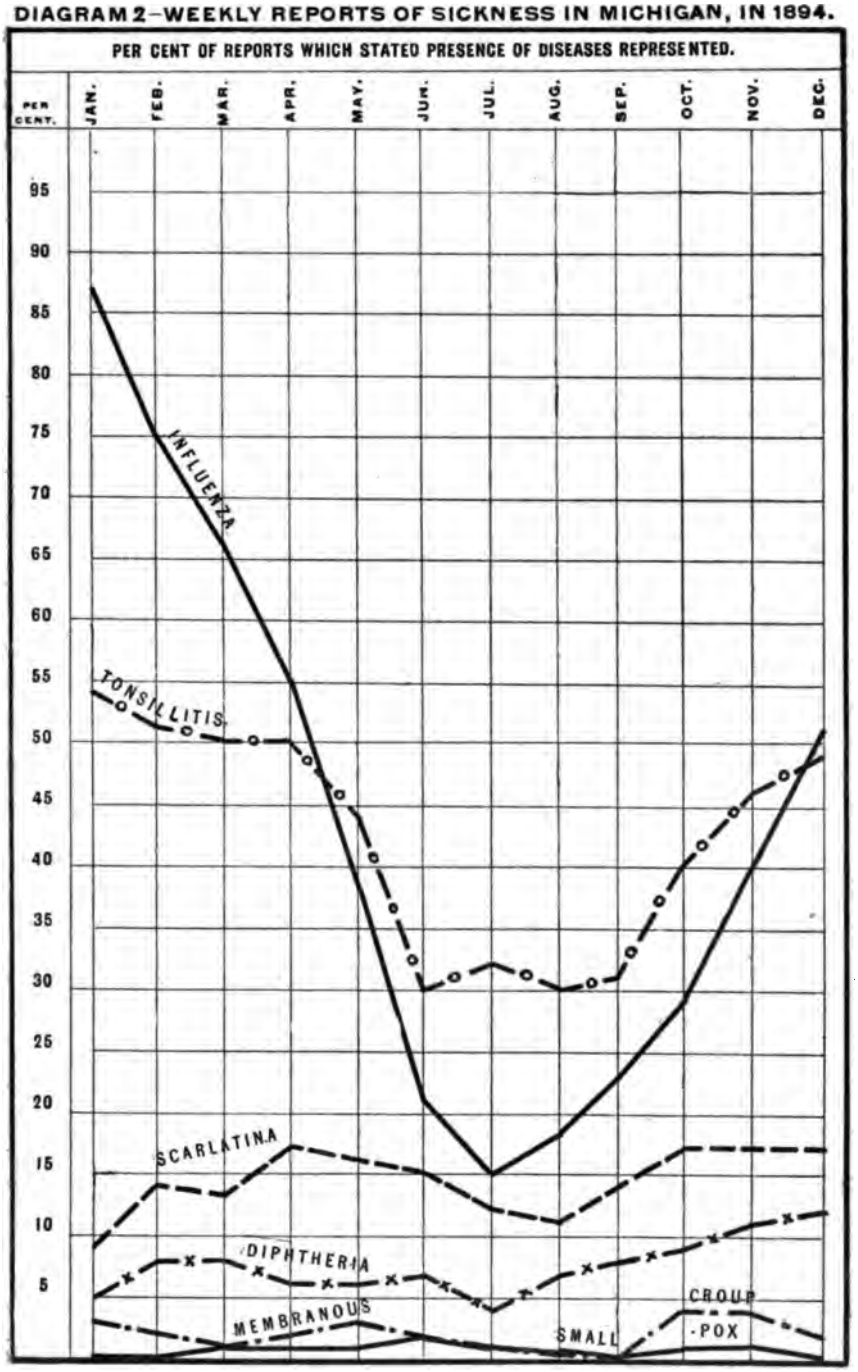
** The daily range from which numbers in this column were computed is the difference between the highest and the lowest of the four observations taken during the 24 hours, namely, at 7 A. M., 2 P. M., 9 P. M. of one day, and 7 A. M. of the following day.

EXHIBIT XII.—PNEUMONIA AND MEMBRANOUS CROUP.—*Stating for the Year and for each Month of the Year 1894, what Per Cent of the Weekly Reports of Sickness stated Presence of Pneumonia and Membranous Croup and what were the Meteorological Conditions as observed at Stations in Michigan.**

PNEUMONIA.	Months in Order of Greatest Per Cent of Weekly Reports Stating Presence of.	Per Cent of Weekly Reports Stating Presence of.	Av. Order of Prevalence where Present. †, ‡.	Temperature, F. Av. Daily Range by Registering Thermometers.	Temperature, F. Average of Three Daily Observations.	Humidity of Air. Av. of 3 Daily Observations. Relative Per Cent of Saturation.	Humidity of Air. Av. of 3 Daily Observations. Absolute, — Grains of Vapor in a Cubic Foot of Air.	Vapor Inhaled and Exhaled from the Air Passages by one Person in 24 Hours, Troy Ounces. Inhaled.‖	Vapor Inhaled and Exhaled from the Air Passages by one Person in 24 Hours, Troy Ounces. Exhaled in excess of that Inhaled.¶	Average Per Cent of Cloudiness.	Ozone, Relative. Scale of 10°. Day Observation, 7 A. M. to 2 P. M.	Ozone, Relative. Scale of 10°. Night Observation, 9 P. M. to 7 A. M.	Av. Velocity of Wind, Miles per Hour by Anemometer.	Atmospheric Pressure, Inches. Reduced to 32° F. Range. Monthly and for Year.	Atmospheric Pressure, Inches. Reduced to 32° F. Range. Av. Daily, by 3 Daily Observations.**	Atmospheric Pressure, Inches. Reduced to 32° F. Average Pressure.
More than Av. Per Cent of Pneumonia.	Jan.	37	3.6	14.45	27.19	82	1.77	1.11	10.57	68	4.33	a 4.21	10.8	1.050	.293	b29.076
	Feb.	32	3.4	16.90	22.37	81	1.40	.88	10.80	57	4.68	4.86	11.7	1.447	.290	b29.087
	Mar.	30	3.7	16.65	38.70	77	2.52	1.58	10.10	55	4.60	4.62	12 4	a .799	.221	29.042
	Apr.	30	3.6	b17.86	46.90	a 73	3.12	1.95	9.73	54	4.23	4.62	a 9.8	.866	.217	b29.064
	Dec.	27	3.7	12.08	31.40	81	1.98	1.24	10.44	68	a 3.51	a 4.23	11.4	.947	.244	b29.082
	May	24	3.5	b18.20	b55.24	76	b 4.16	2.60	9.08	60	4.60	5.03	10.5	.873	a .172	28.995
	Nov.	21	3.4	12.59	33.09	80	2.04	1.28	10.40	73	a 3.41	a 3.87	12.0	1.150	.267	b29.060
Av.		20	3.7	17.84	48.49	75	3.61	2.26	9.42	54	3.95	4.31	10.1	.840	.203	29.053
Less than Av. Per Cent of Pneumonia.	June	15	3.3	22.70	70.37	70	6.07	3.79	7.89	41	3.82	a 4.64	7.8	.644	.124	b29.035
	Oct.	13	3.7	b15.76	50.14	a 78	b 3.59	2.24	9.44	a 64	3.46	3.70	9.7	.752	a .230	b28.961
	Sept.	10	5.3	20.53	61.45	74	5.32	3.33	8.35	41	3.37	3.67	9.1	.680	.155	29.089
	July	9	3.8	23.15	73.30	63	5.90	3.69	7.99	29	3.33	4.07	8.2	.411	.109	29.063
	Aug.	7	4.2	23.16	68.74	68	5.43	3.39	8.29	43	a 4.21	4.16	7.3	.465	.114	29.082
MEMBRANOUS CROUP.																
More than Av. Per Cent of Mem. Croup.	Oct.	4	5.5	15.76	b50.14	78	3.59	2.24	9.44	64	a 3.46	a 3.70	a 9.7	a .752	.230	28.961
	Nov.	4	5.2	12.59	33.09	80	2.04	1.28	10.40	73	a 3.41	a 3.87	12.0	1.150	.267	b29.060
	Jan.	3	3.6	14.45	27.19	82	1.77	1.11	10.57	68	4.33	a 4.21	10.8	1.050	.293	b29.076
	May	3	3.7	b18.20	b55.24	76	b 4.16	2.60	9.08	60	4.60	5.03	10.5	.873	a .172	28.995
Av.		2	4.5	17.84	48.49	75	3.61	2.26	9.42	54	3.95	4.31	10.1	.840	.203	29.053
Less than Av. Per Cent of Mem. Croup.	Feb.	2	5.2	b16.90	b22.37	a 81	b 1.40	.88	10.80	a 57	a 4.68	a 4.86	a 11.7	a1.447	a .290	29.087
	Apr.	2	3.8	17.96	b46.90	73	b 3.12	1.95	9.73	54	a 4.23	a 4.62	9.8	a .866	a .217	29.064
	June	2	3.6	22.70	70.37	70	6.07	3.79	7.89	41	3.82	a 4.64	7.8	.644	.124	b29.035
	Dec.	2	3.8	b12.08	b31.40	a 81	b 1.98	1.24	10.44	a 63	3.51	4.23	a 11.4	a .947	a .244	29.082
	Mar.	1	5.5	b16.65	b38.70	a 77	b 2.52	1.58	10.10	a 55	a 4.60	a 4.62	a 12.4	.799	a .221	b29.042
	July	1	4.3	23.15	73.30	63	5.90	3.69	7.99	29	3 33	4.07	8.2	.411	.109	29.063
	Aug.	0.3	7.0	23.16	68.74	68	5.43	3.39	8.29	43	a 4.21	4.16	7.3	.465	.114	29.082
	Sept.	0	0	20.53	64.45	74	5.32	3.33	8.35	41	3.37	3.67	9.1	.630	.155	29.089

*, †, ‡, §, ‖, ¶, **. For foot-notes with these marks, see Exhibit X, page 123.
a An exception to Proposition 1, relating to Pneumonia and Membranous Croup, on page 121.
b An exception to Proposition 2, relating to Pneumonia and Membranous Croup, on page 121.

DIAGRAM 2—WEEKLY REPORTS OF SICKNESS IN MICHIGAN, IN 1894.



[PLATE 8 I 8]

EXHIBIT XIII.—*By Year and Months for 1894 and for the preceding year, and an Average for the seventeen Years, 1877-93.* Stating on what Per Cent of the Weekly Reports received* PNEUMONIA, MEMBRANOUS CROUP, DIPHTHERIA, RHEUMATISM, INFLUENZA, SCARLET FEVER, NEURALGIA* AND TONSILLITIS,* *were Reported Present, and Comparing the Per Cents for Months in 1894, with the Averages for Corresponding Months in those years.*†

Years, etc.	Year.	Jan.	Feb.	March	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Pneumonia.													
Av. 17 years, 1877-1893	33	54	57	54	48	36	21	14	11	15	19	30	40
Av. 8 years, 1886-1893	27	47	49	45	39	30	16	10	9	12	16	24	33
1893	22	34	36	34	31	20	12	8	7	9	12	24	34
1894	20	37	32	30	30	24	15	9	7	10	13	21	27
In 1894 Greater than Av. 1877-1893													
In 1894 Less than Av. 1877-93	13	17	25	24	18	12	6	5	4	5	6	9	13
In 1894 Greater than Av. 1886-1893‡													
In 1894 Less than Av. 1886-93‡	7	10	17	15	9	6	1	1	2	2	3	3	6

Years, etc.	Year.	Jan.	Feb.	March	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Membranous Croup.													
Av. 17 years, 1877-1893	5	9	8	7	6	4	3	2	2	3	5	7	8
Av. 8 years, 1886-1893	4	6	6	5	4	4	2	1	1	2	4	5	6
1893	2	2	5	4	2	2	0.2	1	1	.02	1	3	2
1894	2	3	2	1	2	3	2	1	0.3	0	4	4	2
In 1894 Greater than Av. 1877-1893													
In 1894 Less than Av. 1877-93	3	6	6	6	4	1	1	1	1.7	3	1	3	6
In 1894 Greater than Av. 1886-1893‡													
In 1894 Less than Av. 1886-93‡	2	3	4	4	2	1	=	=	0.7	2	=	1	4

Years, etc.	Year.	Jan.	Feb.	March	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Diphtheria.													
Av. 17 years, 1877-1893	16	20	17	15	15	13	11	11	12	12	19	21	20
Av. 8 years, 1886-1893	8	11	8	7	7	7	6	6	6	7	11	11	10
1893	7	10	9	6	6	8	9	7	8	6	6	8	6
1894	7	5	8	8	6	6	7	4	7	8	9	11	12
In 1894 Greater than Av. 1877-1893													
In 1894 Less than Av. 1877-93	9	15	9	7	9	7	4	7	5	4	10	10	8
In 1894 Greater than Av. 1886-1893‡			=	1			1	..	1	1	..	=	2
In 1894 Less than Av. 1886-93‡	1	6	=	..	1	1	..	..	..	..	2	=	..

Years, etc.	Year.	Jan.	Feb.	March	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Rheumatism.													
Av. 17 years, 1877-1893	68	72	72	73	75	71	67	61	58	61	66	70	72
Av. 8 years, 1886-1893	67	70	70	78	74	72	68	61	59	62	67	67	70
1893	64	66	67	68	73	67	61	60	58	57	64	64	65
1894	62	65	67	69	66	67	60	58	54	53	58	64	64
In 1894 Greater than Av. 1877-1893													
In 1894 Less than Av. 1877-93	6	7	5	4	9	4	7	3	4	8	8	6	8
In 1894 Greater than Av. 1886-1893‡													
In 1894 Less than Av. 1886-93‡	5	5	3	4	8	5	8	3	5	9	9	3	6

Years, etc.	Year.	Jan.	Feb.	March	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Influenza.													
Av. 17 years, 1877-1893	41	60	64	61	53	39	27	19	19	27	32	41	52
Av. 8 years, 1886-1893	41	63	66	63	55	40	26	17	17	25	31	41	56
1893	43	56	58	57	48	40	21	14	16	25	29	62	93
1894	41	87	75	68	55	48	31	15	18	28	29	40	51
In 1894 Greater than Av. 1877-1893	=	27	11	5	2	..	..	..	..	..	..	..	..
In 1894 Less than Av. 1877-93	=	..	..	..	..	1	6	4	1	4	3	1	1
In 1894 Greater than Av. 1886-1893‡	=	24	9	3	=	..	..	..	1	..	..	..	..
In 1894 Less than Av. 1886-93‡	=	..	..	..	=	2	5	2	..	2	2	1	5

Years, etc.	Year.	Jan.	Feb.	March	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Scarlet Fever.													
Av. 17 years, 1877-1893	14	18	18	18	18	16	14	11	9	10	14	15	15
Av. 8 years, 1886-1893	10	13	11	12	12	11	9	6	6	7	11	11	11
1893	10	16	12	10	12	11	11	7	7	7	10	11	12
1894	14	9	14	13	17	16	15	12	11	14	17	17	17
In 1894 Greater than Av. 1877-1893	=	..	..	..	..	=	1	1	2	4	3	2	2
In 1894 Less than Av. 1877-93	=	9	4	5	1	=	..	..	..	..	..	..	..
In 1894 Greater than Av. 1886-1893‡	4	..	3	1	5	5	6	6	5	7	6	6	6
In 1894 Less than Av. 1886-93‡	..	4	..	..	..	..	..	..	..	..	..	..	..

Years, etc.	Year.	Jan.	Feb.	March	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Neuralgia.													
Av. 15 years, 1879-1893	65	68	70	72	71	66	63	59	57	59	62	66	68
Av. 8 years, 1886-1893	64	68	70	71	70	65	61	59	57	58	61	64	66
1893	57	57	62	65	61	56	50	51	53	54	55	60	57
1894	56	63	59	64	61	57	51	51	47	52	56	57	52
In 1894 Greater than Av. 1877-1893													
In 1894 Less than Av. 1877-93	9	5	11	8	10	9	12	8	10	7	6	9	16
In 1894 Greater than Av. 1886-1893‡													
In 1894 Less than Av. 1886-93‡	8	5	11	7	9	8	10	8	10	6	5	7	14

Years, etc.	Year.	Jan.	Feb.	March	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Tonsillitis.													
Av. 15 years, 1879-1893	48	59	60	59	54	47	40	33	32	36	45	54	59
Av. 8 years, 1886-1893	47	58	59	59	55	48	38	33	32	36	45	53	58
1893	49	62	59	61	54	49	37	37	34	35	44	53	55
1894	42	54	51	50	50	44	30	32	30	31	40	46	49
In 1894 Greater than Av. 1877-1893													
In 1894 Less than Av. 1877-93	6	5	9	9	4	3	10	1	2	5	5	8	10
In 1894 Greater than Av. 1886-1893‡													
In 1894 Less than Av. 1886-93‡	5	4	8	9	5	4	8	1	2	5	5	7	9

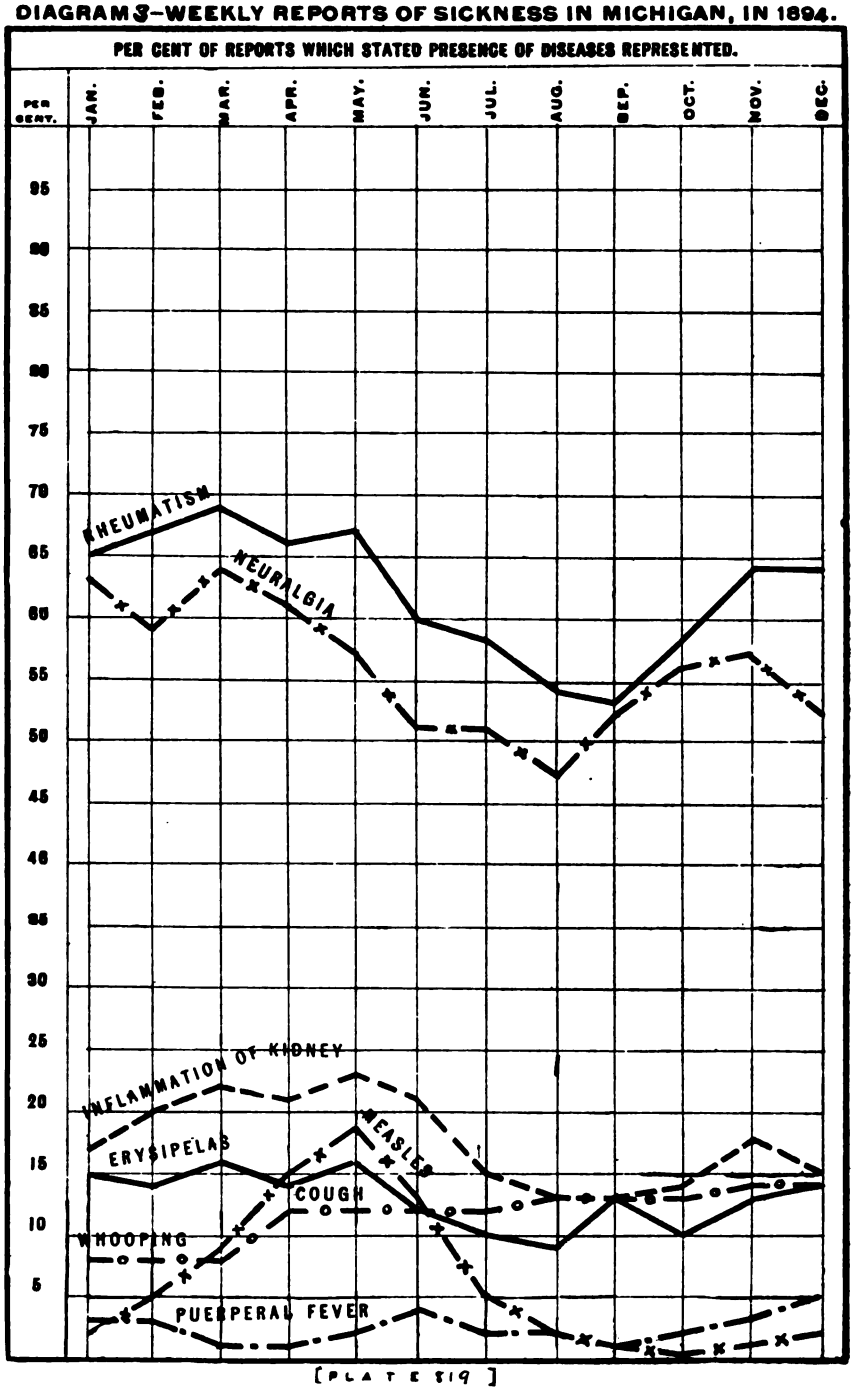
* The average line for tonsillitis and neuralgia includes only the fifteen years, 1879-1893.

† Other statements for 1894, and months in 1894, relative to these diseases are given in Table 2, pages 100-109, and in Exhibits XII., XIV., XV, and XVI., pages 124, 128, 129, and 130, where are also given for convenient comparison statements of coincident meteorological conditions.

‡ This comparison is made because of change of plan of reports in May, 1885, as explained on pages 82-3.

The lines for 1894 in Exhibit XIII. are graphically represented in Diagrams 1, page 89, 2, page 125, 3, page 127, and 4 on page 133.

DIAGRAM 3—WEEKLY REPORTS OF SICKNESS IN MICHIGAN, IN 1894.



[PLATE 819]

EXHIBIT XIV.—DIPHTHERIA AND TONSILLITIS.—*Stating for the Year and for each Month of the Year 1894, what Per Cent of the Weekly Reports of Sickness Stated Presence of Diphtheria and Tonsillitis and what were the Meteorological conditions as observed at Stations in Michigan.**

	Months in Order of Greatest Per Cent of Weekly Reports Stating Presence of.	DIPHTHERIA. Per Cent of Weekly Reports Stating Presence of.	DIPHTHERIA. Av. Order of Prevalence where Present. †,‡.	Temperature, F. Av. Daily Range by Registering Thermometers.	Temperature, F. Average of Three Daily Observations.	Humidity of Air. Av. of 3 Daily Observations. Relative Per Cent of Saturation.	Humidity of Air. Av. of 3 Daily Observations. Absolute,—Grains of Vapor in a Cubic Foot of Air.	Vapor Inhaled and Exhaled from the Air Passages by one Person in 24 Hours, Troy Ounces. Inhaled.‖	Vapor Inhaled and Exhaled from the Air Passages by one Person in 24 Hours, Troy Ounces. Exhaled in excess of that Inhaled.¶	Average Per Cent of Cloudiness.	Ozone, Relative. Scale of 10°. Day Observation, 7 A. M. to 2 P. M.	Ozone, Relative. Scale of 10°. Night Observation, 9 P. M. to 7 A. M.	Av. Velocity of Wind, Miles per Hour by Anemometer.	Atmospheric Pressure, Inches. Reduced to 32° F. Range. Monthly and for Year.	Atmospheric Pressure, Inches. Reduced to 32° F. Range. Av. Daily, by 3 Daily Observations.**	Atmospheric Pressure, Inches. Reduced to 32° F. Average Pressure.
More than Av. Per Cent of Diphtheria.	Dec.	12	4.0	12.08	31.40	81	1.98	1.24	10.44	68	a 3.51	a 4.23	11.4	.947	.244	b29.082
	Nov.	11	3.5	12.59	33.09	80	2.04	1.28	10.40	73	a 3.41	a 3.87	12.0	1.150	.267	b29.060
	Oct.	9	3.6	15.76	b50.14	78	3.59	2.24	9.44	64	a 3.46	a 3.70	a 9.7	a .752	.230	28.961
	Feb.	8	3.1	16.90	22.37	81	1.40	.88	10.80	57	4.68	4.86	11.7	1.447	.290	b29.087
	Mar.	8	2.7	16.65	38.70	77	2.52	1.58	10.10	55	4.60	4.62	12.4	a .799	.221	29.042
	Sept.	8	3.9	b20.53	b64.45	a 74	b 5.32	3.33	8.35	a 41	a 3.37	a 3.67	a 9.1	a .680	a .155	b29.089
	Av.	7	3.5	17.84	48.49	75	3.61	2.26	9.42	54	3.95	4.31	10.1	.840	.203	29.053
Less than Av. Per Cent of Diphtheria.	June	7	2.1	22.70	70.37	70	6.07	3.79	7.89	41	3.82	a 4.64	7.8	.644	.124	b29.035
	Aug.	7	4.1	23.16	68.74	68	5.43	3.39	8.29	43	a 4.21	4.16	7.3	.465	.114	29.082
	April	6	4.4	17.86	b46.90	73	b 3.12	1.95	9.73	54	a 4.23	a 4.62	9.8	a .866	a .217	29.064
	May	6	3.4	18.20	55.24	a 76	4.16	2.60	9.08	a 60	a 4.60	a 5.03	a 10.5	a .873	.172	b28.995
	Jan.	5	2.9	b14.45	b27.19	a 82	b 1.77	1.11	10.57	a 68	a 4.33	4.21	a 10.8	a1.050	a .293	29.076
	July	4	3.4	23.15	73.30	63	5.90	3.69	7.99	29	3.33	4.07	8.2	.411	.109	29.063
More than Av. Per Cent of Tonsillitis.	TONSILLITIS. Jan.	54	3.2	14.45	27.19	82	1.77	1.11	10.57	68	4.33	a 4.21	10.8	1.050	.293	b29.076
	Feb.	51	3.0	16.90	22.37	81	1.40	.88	10.80	57	4.68	4.86	11.7	1.447	.290	b29.087
	Mar.	50	3.1	16.65	38.70	77	2.52	1.58	10.10	55	4.60	4.62	12.4	a .799	.221	29.042
	April	50	3.1	b17.86	46.90	a 73	3.12	1.95	9.73	54	4.23	4.62	a 9.8	.866	.217	b29.064
	Dec.	49	2.7	12.08	31.40	81	1.98	1.24	10.44	68	a 3.51	a 4.23	11.4	.947	.244	b29.082
	Nov.	46	2.7	12.59	33.09	80	2.04	1.28	10.40	73	a 3.41	a 3.87	12.0	1.150	.267	b29.060
	May	44	2.7	b18.20	b55.24	76	b 4.16	2.60	9.08	60	4.60	5.03	10.5	.873	a .172	28.995
	Av.	42	3.0	17.84	48.49	75	3.61	2.26	9.42	54	3.95	4.31	10.1	.840	.203	29.053
Less than Av. Per Cent of Tonsillitis.	Oct.	40	2.7	b15.76	50.14	a 78	b 3.59	2.24	9.44	a 64	3.46	3.70	9.7	.752	a .230	b28.961
	July	32	2.7	23.15	73.30	63	5.90	3.69	7.99	29	3.33	4.07	8.2	.411	.109	29.063
	Sept.	31	3.6	20.53	64.45	74	5.32	3.33	8.35	41	3.37	3.67	9.1	.680	.155	29.089
	June	30	2.7	22.70	70.37	70	6.07	3.79	7.89	41	3.82	a 4.64	7.8	.644	.124	b29.035
	Aug.	30	3.3	23.16	68.74	68	5.43	3.39	8.29	43	a 4.21	4.16	7.3	.465	.114	29.082

*, †, ‡, §, ‖, ¶, **. For foot-notes with these marks, see Exhibit X, page 123.
a An exception to Proposition 1, relating to Diphtheria and Tonsillitis on page 121.
b An exception to Proposition 2, relating to Diphtheria and Tonsillitis on page 121.

EXHIBIT XV.—INFLUENZA AND SCARLET FEVER.—*Stating for the Year and for each Month of the Year 1894, what Per Cent of the Weekly Reports of Sickness Stated Presence of Influenza and Scarlet Fever and what were the Meteorological Conditions as observed at Stations in Michigan.**

	Months in Order of Greatest Per Cent of Weekly Reports Stating Presence of.	INFLUENZA. Per Cent of Weekly Reports stating Presence of.	INFLUENZA. Av. Order of Prevalence where Present. †, ‡.	Temperature, F. Av. Daily Range by Registering Thermometers.	Temperature, F. Average of Three Daily Observations.	Humidity of Air.§ Av. of 3 Daily Observations. Relative Per Cent of Saturation.	Humidity of Air.§ Av. of 3 Daily Observations. Absolute,—Grains of Vapor in a Cubic Foot of Air.	Vapor Inhaled and Exhaled from the Air Passages by one Person in 24 Hours, Troy Ounces. Inhaled.‖	Vapor Inhaled and Exhaled from the Air Passages by one Person in 24 Hours, Troy Ounces. Exhaled in excess of that Inhaled.¶	Average Per Cent of Cloudiness.	Ozone, Relative. Scale of 10. Day Observation, 7 A. M. to 2 P. M.	Ozone, Relative. Scale of 10. Night Observation, 9 P. M. to 7 A. M.	Av. Velocity of Wind, Miles per Hour by Anemometer.	Atmospheric Pressure, Inches, Reduced to 32° F. Range. Monthly and for Year.	Atmospheric Pressure, Inches, Reduced to 32° F. Range. Av. Daily, by 3 Daily Observations.**	Atmospheric Pressure, Inches, Reduced to 32° F. Average Pressure.
More than Av. Per Cent of Influenza.	Jan.	87	1.4	14.45	27.19	82	1.77	1.11	10.57	68	4.33	a 4.21	10.8	1.050	.293	b29.076
	Feb.	75	1.7	16.90	22.37	81	1.40	.88	10.80	57	4.68	4.86	11.7	1.447	.290	b29.087
	Mar.	66	1.9	16.65	38.70	77	2.52	1.58	10.10	55	4.60	4.62	12.4	a .799	.221	29.042
	Apr.	55	2.3	b17.86	46.90	a 73	3.12	1.95	9.73	54	4.23	4.62	a 9.8	.866	.217	b29.064
	Dec.	51	2.0	12.08	31.40	81	1.98	1.24	10.44	63	a 3.51	a 4.23	11.4	.947	.244	b29.082
Av.		41	2.2	17.84	48.49	75	3.61	2.26	9.42	54	3.95	4.31	10.1	.840	.203	29.053
Less than Av. Per Cent of Influenza.	Nov.	40	2.5	b12.59	b33.09	a 80	b 2.04	1.28	10.40	a 73	3.41	3.87	a 12.0	a1.150	a.267	29.060
	May	38	2.5	18.20	55.24	a 76	4.16	2.60	9.08	a 60	a 4.60	a 5.03	a 10.5	a .873	.172	b28.995
	Oct.	29	2.4	b15.76	50.14	a 78	b 3.59	2.24	9.44	a 64	3.46	3.70	9.7	.752	a .230	b28.961
	Sept.	23	3.0	20.53	64.45	74	5.32	3.33	8.35	41	3.37	3.67	9.1	.680	.155	29.089
	June	21	2.5	22.70	70.37	70	6.07	3.79	7.89	41	3.82	4.64	7.8	.644	.124	b29.035
	Aug.	18	2.8	23.16	68.74	68	5.43	3.39	8.29	43	a 4.21	4.16	7.3	.465	.114	29.082
	July	15	2.8	23.15	73.30	63	5.90	3.69	7.99	29	3.33	4.07	8.2	.411	.109	29.063
	SCARLET FEVER.															
More than Av. Per Cent of Scarlet Fever.	Apr.	17	3.2	b17.86	46.90	a 73	3.12	1.95	9.73	54	4.23	4.62	a 9.8	.866	.217	b29.064
	Oct.	17	3.2	15.76	b50.14	78	3.59	2.24	9.44	64	a 3.46	a 3.70	a 9.7	a .752	.230	28.961
	Nov.	17	3.5	12.59	33.09	80	2.04	1.28	10.40	73	a 3.41	a 3.87	12.0	1.150	.267	b29.060
	Dec.	17	3.3	12.08	31.40	81	1.98	1.24	10.44	63	a 3.51	a 4.23	11.4	.947	.244	b29.082
	May	16	3.1	b18.20	b55.24	76	b 4.16	2.60	9.08	60	4.60	5.03	10.5	.873	a .172	28.995
	June	15	2.9	b22.70	b70.37	a 70	b 6.07	3.79	7.89	a 41	a 3.82	4.64	a 7.8	a .644	a .124	29.035
Av.		14	3.3	17.84	48.49	75	3.61	2.26	9.42	54	3.95	4.31	10.1	.840	.203	29.053
Less than Av. Per Cent of Scarlet Fever.	Feb.	14	3.9	b16.90	b22.37	a 81	b 1.40	.88	10.80	a 57	a 4.68	a 4.86	a 11.7	a1.447	a .290	29.087
	Sept.	14	3.5	20.53	64.45	74	5.32	3.33	8.35	41	3.37	3.67	9.1	.680	.155	29.089
	Mar.	13	3.5	b16.65	b38.70	a 77	b 2.52	1.58	10.10	a 55	a 4.60	a 4.62	a 12.4	.799	a .221	b29.042
	July	12	3.0	23.15	73.30	63	5.90	3.69	7.99	29	3.33	4.07	8.2	.411	.109	29.063
	Aug.	11	3.5	23.16	68.74	68	5.43	3.39	8.29	43	a 4.21	4.16	7.3	.465	.114	29.082
	Jan.	9	3.5	b14.45	b27.19	a 82	b 1.77	1.11	10.57	a 68	a 4.33	4.21	a 10.8	a1.050	a .293	29.076

*, †, ‡, §, ‖, ¶, **. For foot-notes with these marks, see Exhibit X, page 123.
a An exception to Proposition 1, relating to Influenza and Scarlet Fever, on page 121.
b An exception to Proposition 2, relating to Influenza and Scarlet Fever, on page 121.

EXHIBIT XVI.—Rheumatism and Neuralgia.—*Stating for the Year and for each Month of the Year 1894, what Per Cent of the Weekly Reports of Sickness Stated Presence of Rheumatism and Neuralgia and what were the Meteorological Conditions as observed at Stations in Michigan.**

Rheumatism.				Temperature, F.		Humidity of Air.§ Av. of 3 Daily Observations.		Vapor Inhaled and Exhaled from the Air Passages by one Person in 24 Hours, Troy Ounces.		Average Per Cent of Cloudiness.	Ozone, Relative. Scale of 10°.		Av. Velocity of Wind, Miles per Hour by Anemometer.	Atmospheric Pressure, Inches Reduced to 32° F.		
Months in Order of Greatest Per Cent of Weekly Reports Stating Presence of.	Per Cent of Weekly Reports Stating Presence of.	Av. Order of Prevalence where Present. †, ‡.		Av. Daily Range by Registering Thermometers.	Average of Three Daily Observations.	Relative Per Cent of Saturation.	Absolute,—Grains of Vapor in a Cubic Foot of Air.	Inhaled. ‖	Exhaled in excess of that Inhaled. ¶		Day Observation, 7 A. M. to 2 P. M.	Night Observation, 9 P. M. to 7 A. M.		Range.		Average Pressure.
														Monthly and for Year.	Av. Daily, by 3 Daily Observations.**	
More than Av. Per Cent of Rheumatism.																
Mar.	69	2.5		16.65	38.70	77	2.52	1.58	10.10	55	4.60	4.62	12.4	a .799	.221	29.042
Feb.	67	2.8		16.90	22.37	81	1.40	.88	10.80	57	4.68	4.86	11.7	1.447	.290	b29.087
May	67	2.2		b18.20	b55.24	76	b 4.16	2.60	9.08	60	4.60	5.03	10.5	.873	a .172	28.995
Apr.	66	2.5		b17.86	46.90	a 73	3.12	1.95	9.73	54	4.23	4.62	a 9.8	.866	.217	b29.064
Jan.	65	2.9		14.45	27.19	82	1.77	1.11	10.57	68	4.33	a 4.21	10.8	1.050	.293	b29.076
Nov.	64	2.4		12.59	33.09	80	2.04	1.28	10.40	72	a 3.41	a 3.87	12.0	1.150	.267	b29.060
Dec.	64	2.5		12.08	31.40	81	1.98	1.24	10.44	63	a 3.51	a 4.23	11.4	.947	.241	b29.082
Av.	62	2.6		17.84	48.49	75	3.61	2.26	9.42	54	3.95	4.31	10.1	.840	.203	29.053
Less than Av. Per Ct. of Rheumatism.																
June	61	2.3		22.70	70.37	70	6.07	3.79	7.89	41	3.82	a 4.64	7.8	.644	.124	b29.035
July	58	2.4		23.15	73.30	63	5.90	3.69	7.99	29	3.33	4.07	8.2	.411	.109	29.063
Oct.	58	2.5		b15.76	50.14	a 78	b 3.59	2.24	9.44	a 64	3.46	3.70	9.7	.752	a .230	b28.961
Aug.	54	2.8		23.16	68.74	68	5.43	3.39	8.29	43	a 4.21	4.16	7.3	.465	.114	29.082
Sept.	53	2.9		20.53	64.45	74	5.32	3.33	8.35	41	3.37	3.67	9.1	.680	.155	29.089
Neuralgia.																
More than Av. Per Cent of Neuralgia.																
Mar.	61	2.4		16.65	38.70	77	2.52	1.58	10.10	55	4.60	4.62	12.4	a .799	.221	29.042
Jan.	63	2.7		14.45	27.19	82	1.77	1.11	10.57	68	4.33	a 4.21	10.8	1.050	.293	b29.076
Apr.	61	2.4		b17.86	46.90	a 73	3.12	1.95	9.73	54	4.23	4.62	a 9.8	.866	.217	b29.064
Feb.	59	2.6		16.90	22.37	81	1.40	.88	10.80	57	4.68	4.86	11.7	1.447	.290	b29.087
May	57	2.2		b18.20	b55.24	76	b 4.16	2.60	9.08	60	4.60	5.03	10.5	.873	a .172	28.995
Nov.	57	2.3		12.59	33.09	80	2.04	1.28	10.40	72	a 3.41	a 3.87	12.0	1.150	.267	b29.060
Av.	56	2.5		17.84	48.49	75	3.61	2.26	9.42	54	3.95	4.31	10.1	.840	.203	29.053
Less than Av. Per Cent of Neuralgia.																
Oct.	56	2.4		b15.76	50.14	a 78	b 3.59	2.24	9.44	a 64	3.46	3.70	9.7	.752	a .230	b28.961
Sept.	52	2.9		20.53	64.45	74	5.32	3.33	8.35	41	3.37	3.67	9.1	.680	.155	29.089
Dec.	52	2.3		b12.08	b31.40	a 81	b 1.98	1.24	10.44	a 63	3.51	4.23	a 11.4	a .947	a .241	29.082
June	51	2.2		22.70	70.37	70	6.07	3.79	7.89	41	3.82	a 4.64	7.8	.644	.124	b29.035
July	51	2.4		23.15	73.30	63	5.90	3.69	7.99	29	3.33	4.07	8 2	.411	.109	29.063
Aug.	47	2.7		23.16	68.74	68	5.43	3.39	8.29	43	a 4.21	4.16	7.3	.465	.114	29.082

*, †, ‡, §, ‖, ¶, **. For foot-notes with these marks, see Exhibit X., page 123.
a An exception to Proposition 1, relating to Rheumatism and Neuralgia on page 121.
b An exception to Proposition 2, relating to Rheumatism and Neuralgia on page 121.

EXHIBIT XVII.—PULMONARY CONSUMPTION AND PLEURITIS.—*Stating for the Year and for each Month of the Year 1894, what Per Cent of the Weekly Reports of Sickness Stated Presence of Pulmonary Consumption and Pleuritis and what were the Meteorological Conditions as observed at Stations in Michigan.**

CONSUMPTION.				Temperature, F.		Humidity of Air.§ Av. of 2 Daily Observations.		Vapor Inhaled and Exhaled from the Air Passages by one Person in 24 Hours, Troy Ounces.		Average Per Cent of Cloudiness.	Ozone, Relative. Scale of 10°.		Av. Velocity of Wind, Miles per Hour by Anemometer.	Atmospheric Pressure, Inches. Reduced to 32° F.		
Months in Order of Greatest Per Cent of Weekly Reports Stating Presence of.	Per Cent of Weekly Reports Stating Presence of.	Av. Order of Prevalence where Present. †, ‡.		Av. Daily Range by Registering Thermometers.	Average of Three Daily Observations.	Relative Per Cent of Saturation.	Absolute,—Grains of Vapor in a Cubic Foot of Air.	Inhaled. ‖	Exhaled in excess of that Inhaled. ¶		Day Observation, 7 A. M. to 2 P. M.	Night Observation, 9 P. M. to 7 A. M.		Range. Monthly and for Year.	Range. Av. Daily, by 3 Daily Observations.**	Average Pressure.
More than Av. Per Cent of Consumption.																
Apr.	41	3.5		b17.86	46.90	a 73	3.12	1.95	9.73	54	4.23	4.62	a 9.8	.866	.217	b29.064
May.	40	3.4		b18.20	b55.24	76	b 4.16	2.60	9.08	60	4.60	5.03	10.5	.873	a .172	28.995
July	39	2.7		b23.15	b73.30	a 63	b 5.90	3.69	7.99	a 29	a 3.33	a 4.07	a 8.2	a .411	a .109	b29.063
June	37	2.9		b22.70	b70.37	a 70	b 6.07	3.79	7.89	a 41	a 3.82	4.64	a 7.8	a .644	a .124	29.035
Sept.	37	3.7		b20.53	b64.45	a 74	b 5.32	3.33	8.35	a 41	a 3.37	a 3.67	a 9.1	a .680	a .155	b29.089
Av.	38	3.4		17.84	48.49	75	3.61	2.26	9.42	54	3.95	4.31	10.1	.840	.203	29.053
Less than Av. Per Cent of Consumption.																
Jan.	36	3.9		b14.45	b27.19	a 82	b 1.77	1.11	10.57	a 68	a 4.33	4.21	a 10.8	a1.050	a .293	29.076
Aug.	35	3.2		23.16	68.74	68	5.43	3.39	8.29	43	a 4.21	4.16	7.3	.465	.114	29.082
Oct.	34	3.6		b15.76	50.14	a 78	b 3.59	2.24	9.44	a 64	3.46	.70	9.7	.752	a .230	b28.961
Feb.	33	3.7		b16.90	b22.37	a 81	b 1.40	.88	10.80	a 57	a 4.68	a 4.86	a 11.7	a1.447	a .290	29.087
Mar.	33	3.2		b16.65	b38.70	a 77	b 2.52	1.58	10.10	a 55	a 4.80	a 4.62	a 12.4	.799	a .321	b29.042
Nov.	33	3.9		b12.59	b33.09	a 80	b 2.04	1.28	10.40	a 73	3.41	3.87	a 12.0	a1.150	a .267	29.060
Dec.	29	3.9		b12.08	b31.40	a 81	b 1.98	1.24	10.44	a 63	3.51	4.23	a 11.4	a .947	a .244	29.082
PLEURITIS.																
More than Av. Per Cent of Pleuritis.																
April	19	3.9		b17.86	46.90	a 73	3.12	1.95	9.73	54	4.23	4.62	a 9.8	.866	.217	b29.064
Jan.	17	3.8		14.45	27.19	82	1.77	1.11	10.57	68	4.33	a 4.21	10.8	1.050	.293	b29.076
Mar.	17	4.4		16.65	38.70	77	2.52	1.58	10.10	55	4.80	4.62	12.4	a .799	.221	29.042
Feb.	16	3.9		16.90	22.37	81	1.40	.88	10.80	57	4.68	4.86	11.7	1.447	.290	b29.087
Nov.	15	3.7		12.59	33.09	80	2.04	1.28	10.40	73	a 3.41	a 3.87	12.0	1.150	.267	b29.060
May	14	3.6		b18.20	b55.24	76	b 4.16	2.60	9.08	60	4.60	5.03	10.5	.873	a .172	28.995
Av.	13	3.8		17.84	48.49	75	3.61	2.26	9.42	54	3.95	4.31	10.1	.840	.203	29.053
Less than Av. Per Cent of Pleuritis.																
Dec.	13	4.0		b12.08	b31.40	a 81	b 1.98	1.24	10.44	a 63	3.51	4.23	a 11.4	a .947	a .244	29.082
Oct.	12	3.4		b15.76	50.14	a 78	b 3.59	2.24	9.44	a 64	3.46	3.70	9.7	.752	a .230	b28.961
June	11	3.1		22.70	70.37	70	6.07	3.79	7.89	41	3.82	a 4.64	7.8	.644	.124	b29.035
Sept.	11	4.2		20.53	64.45	74	5.32	3.33	8.35	41	3.37	3.67	9.1	.680	.155	29.089
July	10	3.9		23.15	73.30	63	5.90	3.69	7.99	29	3.33	4.07	8.2	.411	.109	29.063
Aug.	7	4.1		23.16	68.74	68	5.43	3.39	8.29	43	a 4.21	4.16	7.3	.465	.114	29.082

*, †, ‡, §, ‖, ¶, **. For foot-notes with these marks, see Exhibit X., page 123.
a An exception to Proposition 1, relating to Pulmonary Consumption and Pleuritis on page 121.
b An exception to Proposition 2, relating to Pulmonary Consumption and Pleuritis on page 121.

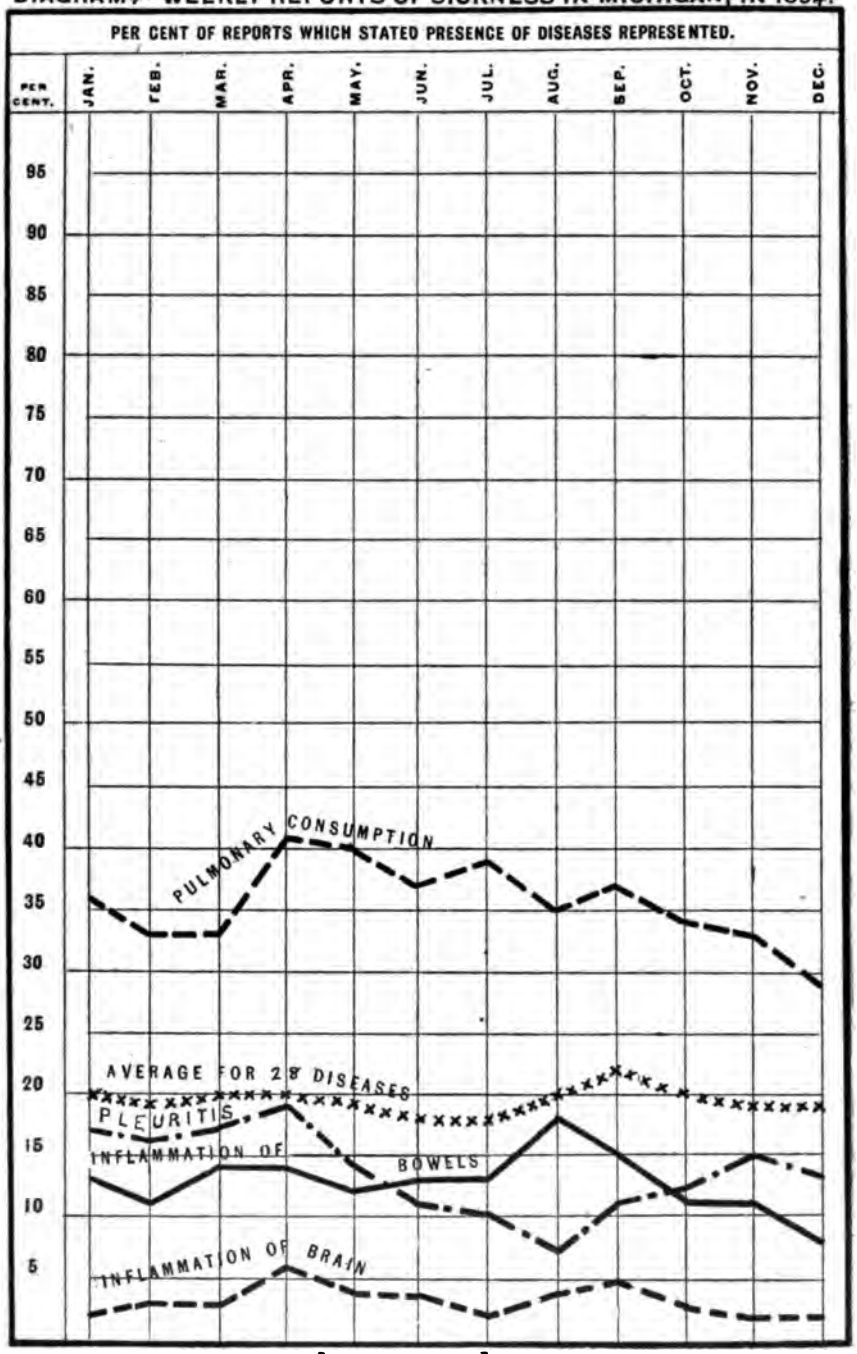
EXHIBIT XVIII.—SICKNESS FROM CONSUMPTION.—1878-94.—*By Year and Months for each of the seventeen years, 1878-94, and an Average for the fourteen years, 1878-93, also for the six years, 1886-93; Stating on what Per Cent of the Weekly Reports received* CONSUMPTION *was reported Present, and Comparing the Per Cents for 1894 with the Averages for corresponding Months in those Years.*

Years, etc.	Annual Av.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Average 16 years, 1878-93*	57	58	59	61	62	59	57	55	53	54	55	55	58
Average 8 years, 1886-93†	48	50	50	52	53	50	47	45	45	45	45	45	47
1877*	52	50	47	47	53	49	50	43	35	38	54	68	65
1878	71	67	72	76	75	72	68	68	65	70	73	78	71
1879	70	71	71	69	77	74	73	69	67	67	69	67	64
1880	68	65	69	70	72	70	69	66	62	63	66	68	70
1881	71	74	76	73	76	69	68	67	67	70	73	74	67
1882	66	66	68	66	68	69	66	67	63	63	65	62	65
1883	61	69	66	66	65	62	61	59	55	57	58	58	60
1884	63	56	61	66	70	67	65	63	63	63	65	61	58
1885	58	60	63	71	69	58	61	56	52	54	55	56	56
1886	55	61	58	60	61	60	55	51	52	48	51	55	54
1887	51	53	54	61	61	54	48	48	47	45	48	47	50
1888	49	50	51	52	47	53	56	51	49	44	43	44	48
1889	48	49	49	50	50	46	47	47	46	50	52	49	51
1890	52	50	53	55	61	57	52	45	50	51	51	49	55
1891	49	58	51	54	59	55	46	45	43	43	44	46	45
1892	38	45	45	40	41	33	35	39	37	39	36	34	37
1893	38	35	38	43	45	43	37	35	37	37	32	37	38
1894 (see Diagram on opposite page)	36	36	33	33	41	40	37	39	35	37	34	33	29
In 1894 Less than Av. 1878-93	21	22	26	28	21	19	20	16	18	17	21	22	27
In 1894 Less than Av. 1886-93†	12	14	17	19	12	10	10	6	10	8	11	12	18

* As consumption was not printed on the first blanks, nor on all used in 1877, that year is excluded from the average line.

† This comparison is made because of change of plan of reports in May, 1885, as explained on pages 82-83.

DIAGRAM 4—WEEKLY REPORTS OF SICKNESS IN MICHIGAN, IN 1894.



[PLATE 820]

RELATIONS OF DIARRHEA TO METEOROLOGICAL CONDITIONS.

PROPOSITION 1.—That in months when **more** than the average per cent of weekly reports stated the presence of diarrhea, the average daily temperature, the average daily range of temperature, the absolute humidity of the atmosphere, and the average daily pressure of the atmosphere were **greater** than the average for the year; and in months when **less** than the average per cent of reports stated the presence of diarrhea, these conditions were **less** than the average for the year. In Exhibit XIX., page 999, the letter *a* marks exceptions to this proposition for the year 1894.

PROPOSITION 2.—That in months when **more** than the average per cent of weekly reports stated the presence of diarrhea, the relative humidity of the atmosphere, the average per cent of cloudiness, the ozone, the average velocity of the wind, and the monthly and average daily range of the barometer were **less** than the average for the year; and in months when **less** than the average per cent of reports stated the presence of diarrhea, these conditions were **greater** than the average for the year. In Exhibit XIX., page 136, the letter *b* marks exceptions to this proposition for 1894.

Explanations of Propositions 1 and 2 are given on page 120, and a summary of the evidence in Exhibit XIX., is given in Exhibit XXVI., on a following page.

PROPOSITION 3.—For those months which are not, as regards the absolute humidity of the atmosphere, exceptions to Proposition 1, it is true also that the quantity of vapor inhaled daily was **greater** than the average, and the quantity exhaled daily in excess of that inhaled was **less** than the average in months when **more** than the average per cent of reports stated presence of diarrhea; and that **less** vapor was inhaled and a **greater** excess exhaled daily in months when the per cent of reports stating presence of diarrhea, was **less** than the average.

Proposition 3 is true also in relation to cholera infantum, intermittent fever, remittent fever, typhoid fever, typho-malarial fever, measles, whooping cough, cholera morbus and dysentery, treated in Exhibits XIX., XXI., XXII., XXIII. and XXIV., page 136, and following pages.

On what per cent of the weekly reports received, by months in the seventeen years, 1877–1893, the ten foregoing diseases were reported present, is stated in Exhibit XX., page 137. In Diagram 1, page 89, is graphically represented by months what per cent of the reports in each month in 1894, stated the presence of diarrhea

The greatest sickness reported from diarrhea in 1894, was in the months of August, September, July and October.

As shown by Exhibit XX., the reports indicate a decreased prevalence of diarrhea in the year 1894. Compared with the year 1893, there was a slightly increased prevalence of diarrhea in June and July, and in every other month there was a marked decrease, except December which was the same.

Compared with the corresponding months in the average for the seventeen years, 1877–1893, the per cent of reports of diarrhea in 1894, for every month of the year was considerably less.

The average temperature for the year 1894, was slightly higher than the average for 1877–1893. It was also higher for each month of the year, except in February, May and November, than the average for corresponding months in the seventeen years, 1877–93. The absolute humidity was slightly more for the year and for each month of the year except February, July, August and November, than the average for 1877–1893. The relative humidity was less for the year 1894, and for each month of the year, except in April, May and October, than the average for the sixteen years, 1878–1893. In November it was the same.

RELATIONS OF CHOLERA INFANTUM AND OTHER "WARM WEATHER" DISEASES TO METEOROLOGICAL CONDITIONS.

PROPOSITION 1.—That in months when **more** than the average per cent of weekly reports stated the presence of cholera infantum (or of intermittent fever, remittent fever, typhoid fever, typho-malarial fever, cholera morbus, dysentery, measles, or whooping-cough), the average daily temperature, the average daily range of temperature, the absolute humidity of the atmosphere, and the average daily pressure of the atmosphere were **greater** than the average for the year; and in months when **less** than the average per cent of reports stated the presence of cholera infantum (or of the other diseases named), these conditions were **less** than the average for the year. In Exhibit XIX., page 136, the letter *a* marks exceptions to this proposition for the year 1894.

Explanations of Propositions 1 and 2 are given on page 120, and a summary of the evidence of Exhibit XIX. is given in Exhibit XXVI., on a following page.

PROPOSITION 2.—That in months when **more** than the average per cent of weekly reports stated the presence of cholera infantum (or of intermittent fever, remittent fever, typhoid fever, typho-malarial fever, measles, or whooping-cough), the relative humidity of the atmosphere, the average per cent of cloudiness, the ozone, the average velocity of the wind, and the monthly and average daily range of the barometer were **less** than the average for the year; and that in months when **less** than the average per cent of reports stated the presence of cholera infantum (or of the other diseases named), these conditions were **greater** than the average for the year. In Exhibit XIX., page 136, the letter *b* marks exceptions to this proposition for 1894.

What per cent of all the weekly reports of sickness in each month in 1894, stated the presence of cholera infantum is graphically represented by months in Diagram 1, page 89. What per cent of the reports received by months in the seventeen years, 1877–93, stated presence of cholera infantum and of the other diseases mentioned in Propositions 1 and 2, is stated in Exhibit XX., page 137.

Cholera infantum was most prevalent during the hot months and in October, in 1894, but in each month of 1894, except in April, May and October, there was much less than the average sickness from this disease.

EXHIBIT XIX.—DIARRHEA AND CHOLERA INFANTUM.—*Stating for the Year and for each Month of the Year 1894, what Per Cent of the Weekly Reports of Sickness Stated Presence of Diarrhea and Cholera Infantum and what were the Meteorological Conditions as observed at Stations in Michigan.**

Months in Order of Greatest Per Cent of Weekly Reports Stating Presence of.	Diarrhea. Per Cent of Weekly Reports Stating Presence of.	Diarrhea. Av. Order of Prevalence where present. †, ‡.	Temperature, F. Av. Daily Range by Registering Thermometers.	Temperature, F. Average of Three Daily Observations.	Humidity of Air, § Av. of 3 Daily Observations. Relative Per Cent of Saturation.	Humidity of Air, § Av. of 3 Daily Observations. Absolute, — Grains of Vapor in a Cubic Foot of Air.	Vapor Inhaled and Exhaled from the Air Passages by one Person in 24 Hours, Troy Ounces. Inhaled. ‖	Vapor Inhaled and Exhaled from the Air Passages by one Person in 24 Hours, Troy Ounces. Exhaled in Excess of that Inhaled. ¶	Average Per Cent of Cloudiness.	Ozone, Relative. Scale of 10°. Day Observation, 7 A. M. to 2 P. M.	Ozone, Relative. Scale of 10°. Night Observation, 9 P. M. to 7 A. M.	Av. Velocity of Wind, Miles per Hour by Anemometer.	Atmospheric Pressure, inches. Reduced to 32° F. Range. Monthly and for Year.	Atmospheric Pressure, inches. Reduced to 32° F. Range. Av. Daily by 3 Daily Observations. **	Atmospheric Pressure, inches. Reduced to 32° F. Average Pressure.
More than Av. Per Cent of Diarrhea. Aug.	72	1.6	23.16	68.74	68	5.43	3.39	8.29	43	4.21	4.16	7.3	.465	.114	29.082
More than Av. Per Cent of Diarrhea. Sept.	71	1.7	20.53	64.45	74	5.32	3.33	8.35	41	3.37	3.67	9.1	.680	.155	29.089
More than Av. Per Cent of Diarrhea. July	55	1.9	23.15	73.30	63	5.90	3.69	7.99	29	3.33	4.07	8.2	.411	.109	29.063
More than Av. Per Cent of Diarrhea. Oct.	49	2.4	a15.76	50.14	b 78	a 3.59	2.24	9.44	b 64	3.46	3.70	9.7	.752	b .230	a28.961
Av.	40	2.5	17.84	48.49	75	3.61	2.26	9.42	54	3.95	4.31	10.1	.840	.203	29.053
Less than Av. Per Cent of Diarrhea. June	39	2.3	a22.70	a70.37	b 70	a 6.07	3.79	7.89	b 41	b 3.82	4.64	b 7.8	b .644	b .124	29.035
Less than Av. Per Cent of Diarrhea. May	27	3.1	a18.20	a55.24	76	a 4.16	2.60	9.08	60	4.60	5.03	10.5	.873	b .172	28.995
Less than Av. Per Cent of Diarrhea. Jan.	26	3.6	14.45	27.19	82	1.77	1.11	10.57	68	4.33	b 4.21	10.8	1.050	.293	a29.076
Less than Av. Per Cent of Diarrhea. Apr.	26	3.2	a17.86	46.90	b 73	3.12	1.95	9.73	54	4.23	4.62	b 9.8	.866	.217	a29.064
Less than Av. Per Cent of Diarrhea. Nov.	26	3.0	12.59	33.09	80	2.04	1.28	10.40	73	b 3.41	b 3.87	12.0	1.150	.267	a29.060
Less than Av. Per Cent of Diarrhea. Mar.	24	3.0	16.65	38.70	77	2.52	1.58	10.10	55	4.60	4.62	12.4	b .799	.221	29.042
Less than Av. Per Cent of Diarrhea. Dec.	24	3.1	12.08	31.40	81	1.98	1.24	10.44	63	b 3.51	b 4.23	11.4	.947	.244	a29.082
Less than Av. Per Cent of Diarrhea. Feb.	17	3.7	16.90	22.37	81	1.40	.88	10.80	57	4.68	4.86	11.7	1.447	.290	a29.087
Cholera Infantum.															
More than Av. Pr. Ct. of Cholera Infantum. Aug.	38	2.8	23.16	68.74	68	5.43	3.39	8.29	43	b 4.21	4.16	7.3	.465	.114	29.082
More than Av. Pr. Ct. of Cholera Infantum. Sept.	33	3.5	20.53	64.45	74	5.32	3.33	8.35	41	3.37	3.67	9.1	.680	.155	29.089
More than Av. Pr. Ct. of Cholera Infantum. July	22	2.8	23.15	73.30	63	5.90	3.69	7.99	29	3.33	4.07	8.2	.411	.109	29.063
More than Av. Pr. Ct. of Cholera Infantum. Oct.	13	3.7	a15.76	50.14	b 78	a 3.59	2.24	9.44	b 64	3.46	3.70	9.7	.752	b .230	a28.961
Av.	12	3.3	17.84	48.49	75	3.61	2.26	9.42	54	3.95	4.31	10.1	.840	.203	29.053
Less than Av. Per Cent of Cholera Infantum. June	8	3.6	a22.70	a70.37	b 70	a 6.07	3.79	7.89	b 41	b 3.82	4.64	b 7.8	b .644	b .124	29.035
Less than Av. Per Cent of Cholera Infantum. May	4	3.5	a18.20	a55.24	76	a 4.16	2.60	9.08	60	4.60	5.03	10.5	.873	b .172	28.995
Less than Av. Per Cent of Cholera Infantum. Apr.	2	5.0	a17.86	46.90	b 73	3.12	1.95	9.73	54	4.23	4.62	b 9.8	.866	.217	a29.064
Less than Av. Per Cent of Cholera Infantum. Nov.	2	4.0	12.59	33.09	80	2.04	1.28	10.40	73	b 3.41	b 3.87	12.0	1.150	.267	a29.060
Less than Av. Per Cent of Cholera Infantum. Jan.	1	4.7	14.45	27.19	82	1.77	1.11	10.57	68	4.33	b 4.21	10.8	1.050	.293	a29.076
Less than Av. Per Cent of Cholera Infantum. Mar.	1	5.0	16.65	38.70	77	2.52	1.58	10.10	55	4.60	4.62	12.4	b .799	.221	29.042
Less than Av. Per Cent of Cholera Infantum. Dec.	1	2.4	12.08	31.40	81	1.98	1.24	10.44	63	b 3.51	b 4.23	11.4	.947	.244	a29.082
Less than Av. Per Cent of Cholera Infantum. Feb.	0	0	16.90	22.37	81	1.40	.88	10.80	57	4.68	4.86	11.7	1.447	.290	a29.087

* + †, §, ¶, **. For foot-notes with these marks, see Exhibit X., page 123.
xception to Proposition 1, relating to Diarrhea and Cholera Infantum, on page 135.
xception to Proposition 2, relating to Diarrhea and Cholera Infantum, on page 135.

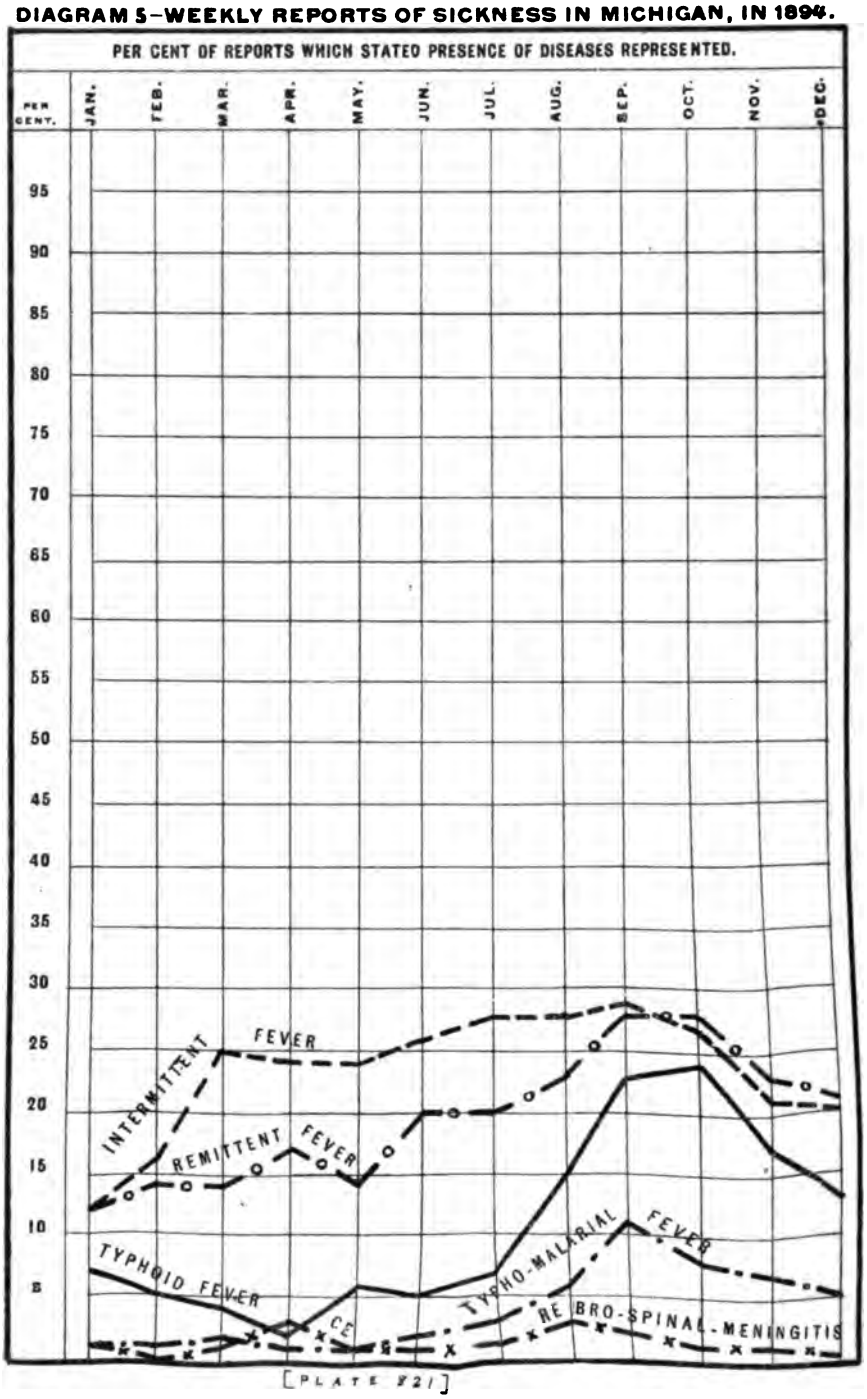
EXHIBIT XX.—*By Year and Months for 1894 and for the preceding year, and an Average for the seventeen years, 1877-93, also for the eight years, 1886-93. Stating on what Per Cent of the Weekly Reports received* DIARRHEA, CHOLERA INFANTUM, INTERMITTENT FEVER, REMITTENT FEVER, TYPHOID FEVER, TYPHO-MALARIAL FEVER, MEASLES, WHOOPING-COUGH, CHOLERA MORBUS AND DYSENTERY *were Reported Present, and Comparing the Per Cents for 1894, with the Averages for Corresponding Months in those Years.**

	Years, etc.	Year.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Diarrhea.	Av. 17 years, 1877-1893	46	27	28	29	31	35	48	69	84	78	54	34	27
	Av. 8 years, 1886-1893	44	28	28	29	30	33	39	65	81	76	52	33	27
	1893	40	28	25	25	29	28	36	54	74	75	55	29	24
	1894	40	26	17	24	26	27	39	55	72	71	49	26	24
	In 1894 Greater than Av. 1877-1893	—	—	—	—	—	—	—	—	—	—	—	—	—
	In 1894 Less than Av. 1877-93	6	1	11	5	5	8	4	14	12	7	5	8	3
	In 1894 Greater than Av. 1886-1893†	—	—	—	—	—	—	=	—	—	—	—	—	—
	In 1894 Less than Av. 1886-93†	4	2	11	5	4	6	=	10	9	5	3	7	3
Cholera Infantum.	Av. 17 years, 1877-1893	12	2	2	2	2	3	9	28	44	34	12	4	2
	Av. 8 years, 1886-1893	12	2	2	1	1	3	8	25	41	33	11	3	2
	1893	10	2	1	1	1	1	9	17	34	33	15	2	1
	1894	12	1	0	1	2	4	8	22	38	33	13	2	1
	In 1894 Greater than Av. 1877-1893	—	—	—	—	—	—	—	—	—	—	—	—	—
	In 1894 Less than Av. 1877-93	..	..	..	..	=	1	..	..	..	..	1	..	..
	In 1894 Greater than Av. 1886-1893†	—	—	—	—	—	—	—	—	—	—	—	—	—
	In 1894 Less than Av. 1886-93†	=	..	1	2	..	..	=	3	3	=	..	1	1
Intermittent Fever.	Av. 17 years, 1877-1893	58	48	48	51	58	62	63	65	66	65	63	56	49
	Av. 8 years, 1886-1893	40	34	34	35	41	41	41	44	46	44	43	38	32
	1893	24	19	14	18	25	26	25	27	32	29	28	26	17
	1894	24	12	16	25	24	24	26	28	28	29	27	21	20
	In 1894 Greater than Av. 1877-1893	—	—	—	—	—	—	—	—	—	—	—	—	—
	In 1894 Less than Av. 1877-93	34	36	32	26	34	38	37	37	38	36	36	35	29
	In 1894 Greater than Av. 1886-1893†	—	—	—	—	—	—	—	—	—	—	—	—	—
	In 1894 Less than Av. 1886-93†	16	22	18	10	17	17	15	16	18	15	16	17	12
Remittent Fever.	Av. 17 years, 1877-1893	39	33	32	33	36	38	39	41	48	50	48	40	35
	Av. 8 years, 1886-1893	28	25	23	24	26	26	28	28	34	36	34	29	25
	1893	18	13	13	14	14	19	21	20	22	25	24	21	12
	1894	20	12	14	14	17	14	20	20	23	28	28	23	21
	In 1894 Greater than Av. 1877-1893	—	—	—	—	—	—	—	—	—	—	—	—	—
	In 1894 Less than Av. 1877-93	19	21	18	19	19	24	19	21	25	22	20	17	14
	In 1894 Greater than Av. 1886-1893†	—	—	—	—	—	—	—	—	—	—	—	—	—
	In 1894 Less than Av. 1886-93†	8	13	9	10	9	12	6	8	11	8	6	6	4
Typhoid Fever.	Av. 17 years, 1877-1893	11	9	7	5	5	5	5	7	13	19	21	19	13
	Av. 8 years, 1886-1893	9	7	5	4	3	4	5	6	13	18	20	16	11
	1893	9	6	4	3	3	4	6	7	12	16	23	20	8
	1894	11	7	5	4	2	6	5	7	15	23	24	17	13
	In 1894 Greater than Av. 1877-1893	=	—	—	—	—	1	=	=	2	4	3	—	=
	In 1894 Less than Av. 1877-93	=	2	2	1	3	..	=	=	..	..	..	2	=
	In 1894 Greater than Av. 1886-1893†	2	=	=	=	..	2	=	1	2	5	4	1	=
	In 1894 Less than Av. 1886-93†	..	=	=	=	1	..	=	..	..	..	..	..	..
Typho-mal'r'l Fever.	Av. 17 years, 1877-1893	17	13	11	10	10	9	9	12	20	31	33	24	16
	Av. 8 years, 1886-1893	11	8	6	6	7	6	6	8	15	20	20	14	9
	1893	4	5	2	2	3	2	1	2	7	9	8	8	4
	1894	4	1	1	2	1	1	2	3	6	11	8	7	5
	In 1894 Greater than Av. 1877-1893	—	—	—	—	—	—	—	—	—	—	—	—	—
	In 1894 Less than Av. 1877-93	13	12	10	8	9	8	7	9	14	20	25	17	11
	In 1894 Greater than Av. 1886-1893†	—	—	—	—	—	—	—	—	—	—	—	—	—
	In 1894 Less than Av. 1886-93†	7	7	5	4	6	5	4	5	9	9	12	7	4
Measles.	Av. 17 years, 1877-1893	11	10	13	16	20	23	19	12	6	4	4	5	7
	Av. 8 years, 1886-1893	9	9	13	15	17	19	16	9	4	3	3	4	6
	1893	7	10	12	10	11	17	13	8	3	2	1	2	2
	1894	6	2	5	9	15	19	13	5	2	1	0.4	1	2
	In 1894 Greater than Av. 1877-1893	—	—	—	—	—	—	—	—	—	—	—	—	—
	In 1894 Less than Av. 1877-93	5	8	8	7	5	4	6	7	4	2	3.6	4	5
	In 1894 Greater than Av. 1886-1893†	—	—	—	—	—	=	—	—	—	—	—	—	—
	In 1894 Less than Av. 1886-93†	3	7	8	6	2	=	3	4	2	2	2.6	3	4
Whooping-cough.	Av. 17 years, 1877-1893	16	16	16	16	15	16	16	19	19	17	15	15	15
	Av. 8 years, 1886-1893	12	10	12	12	12	14	13	15	15	13	10	10	10
	1893	9	7	9	7	7	10	12	11	13	9	7	7	8
	1894	12	8	8	8	12	12	12	12	13	13	13	14	14
	In 1894 Greater than Av. 1877-1893	—	—	—	—	—	—	—	—	—	—	—	—	—
	In 1894 Less than Av. 1877-93	4	8	8	8	3	4	4	7	6	4	2	1	1
	In 1894 Greater than Av. 1886-1893†	—	—	—	—	=	—	—	—	—	—	—	—	—
	In 1894 Less than Av. 1886-93†	=	2	4	4	=	2	1	3	2	=	3	4	4
Cholera Morbus.	Av. 17 years, 1877-1893	17	4	4	5	5	7	16	42	54	38	15	6	5
	Av. 8 years, 1886-1893	16	3	3	3	4	7	14	36	50	36	13	5	4
	1893	14	4	4	5	4	4	13	24	43	38	13	5	3
	1894	14	2	1	3	6	8	14	27	38	37	13	5	4
	In 1894 Greater than Av. 1877-1893	—	—	—	—	—	1	1	—	—	—	—	—	—
	In 1894 Less than Av. 1877-93	3	2	3	2	..	..	2	15	16	1	2	1	1
	In 1894 Greater than Av. 1886-1893†	—	—	—	—	—	—	—	—	—	—	—	—	—
	In 1894 Less than Av. 1886-93†	..	..	..	=	2	1	=	..	..	1	=	=	=
Dysentery.	Av. 17 years, 1877-1893	18	7	6	7	8	8	12	27	50	45	23	11	7
	Av. 8 years, 1886-1893	16	7	6	7	6	8	10	22	44	42	21	10	6
	1893	13	7	5	7	4	4	9	13	34	41	25	9	2
	1894	14	5	2	4	4	5	7	20	38	40	20	9	4
	In 1894 Greater than Av. 1877-1893	—	—	—	—	—	—	—	—	—	—	—	—	—
	In 1894 Less than Av. 1877-93	4	2	4	3	4	3	5	7	12	5	3	2	3
	In 1894 Greater than Av. 1886-1893†	—	—	—	—	—	—	—	—	—	—	—	—	—
	In 1894 Less than Av. 1886-93†	2	2	4	3	2	3	3	2	6	2	1	1	2

*Other statements for 1894, and months in 1894, relative to these diseases are given in Table 2, pages 100-109, and in Exhibits XIX., XXI., XXII., XXIII. and XXIV., pages 136, 139, 140, 141 and 142, where are also given for convenient comparison statements of coincident meteorological conditions. The lines for 1894 are graphically represented in Diagrams 1, page 89, 3, page 127, and 5, page 138.

†This comparison is made because of change of plan of reports in May, 1885, as explained on pages 82-83.

DIAGRAM 5—WEEKLY REPORTS OF SICKNESS IN MICHIGAN, IN 1894.



[PLATE 821]

EXHIBIT XXII.—TYPHOID FEVER AND TYPHO-MALARIAL FEVER.—*Stating for the Year and for each Month of the Year 1894, what Per Cent of the Weekly Reports of Sickness Stated Presence of Typhoid Fever and Typho-Malarial Fever and what were the Meteorological Conditions as observed at Stations in Michigan.**

Typhoid Fever.				Temperature, F.		Humidity of Air. Av. of 3 Daily Observations.		Vapor Inhaled and Exhaled from the Air Passages by one Person in 24 Hours, Troy Ounces.		Average Per Cent of Cloudiness.	Ozone, Relative. Scale of 10°.		Av. Velocity of Wind, Miles per Hour by Anemometer.	Atmospheric Pressure, Inches. Reduced to 32° F.		
Months in Order of Greatest Per Cent of Weekly Reports Stating Presence of.		Per Cent of Weekly Reports Stating Presence of.	Av. Order of Prevalence where Present. †, ‡.	Av. Daily Range by Registering Thermometers.	Average of Three Daily Observations.	Relative Per Cent of Saturation.	Absolute, — Grains of Vapor in a Cubic Foot of Air.	Inhaled. ‖	Exhaled in excess of that Inhaled. ¶		Day Observation, 7 A. M. to 2 P. M.	Night Observation, 9 P. M. to 7 A. M.		Range. Monthly and for Year.	Range. Av. Daily, by 3 Daily Observations. **	Average Pressure.
More than Av. Per Cent of Typhoid Fever.	Oct.	24	3.0	a15.76	50.14	b 78	a 3.59	2.24	9.44	b 64	3.46	3.70	9.7	.752	b .230	a28.961
	Sept.	23	3.3	20.53	64.45	74	5.32	3 33	8.35	41	3.37	3.67	9.1	.680	.155	29.089
	Nov.	17	3.3	a12.59	a33.09	b 80	a 2.04	1.28	10.40	b 73	3.41	3.87	b 12.0	b1.150	b .267	29.060
	Aug.	15	3.5	23.16	68.74	68	5.43	3.39	8.29	43	b 4.21	4.16	7.3	.465	.114	29.082
	Dec.	13	3.7	a12.08	a31.40	b 81	a 1.98	1.24	10.44	b 63	3.51	4.23	b 11.4	b .947	b .244	29.082
Av.		11	3.6	17.84	48.49	75	3.61	2.26	9.42	54	3.95	4.31	10.1	.840	.203	29.053
Less than Av. Per Cent of Typhoid Fever.	Jan.	7	3.9	14.45	27.19	82	1.77	1.11	10.57	68	4.33	b 4.21	10.8	1.050	.293	a29.076
	July	7	3.7	a28.15	a73.30	b 63	a 5.90	3.69	7.99	b 29	b 3.33	b 4.07	b 8.2	b .411	b .109	a29.063
	May	6	4.3	a18.20	a55.24	76	a 4.16	2.60	9.08	60	4.60	5.03	10.5	.873	b .172	28.995
	Feb.	5	3.7	16.90	22.37	81	1.40	.88	10.80	57	4.68	4.86	11.7	1.447	.290	a29.087
	June	5	4.5	a22.70	a70.37	b 70	a 6.07	3.79	7.89	b 41	b 3.82	4.64	b 7.8	b .644	b .124	29 035
	Mar.	4	5.3	16.65	38.70	77	2.52	1.58	10.10	55	4.60	4.62	12.4	b .799	.221	29.042
	April	2	5.3	a17.86	46.90	b 73	3.12	1.95	9.73	54	4.23	4.62	b 9.8	.866	.217	a29.064
Typho-Mal. Fever.																
More than Av. Per Cent of Typho-mal. Fever.	Sept.	11	3.4	20.53	64.45	74	5.32	3.33	8.35	41	3.37	3.67	9.1	.680	.155	29.089
	Oct.	8	3.5	a15.76	50.14	b 78	a 3.59	2.24	9.44	b 64	3.46	3.70	9.7	.752	b .230	a28.961
	Nov.	7	3.7	a12.59	a33.09	b 80	a 2.04	1.28	10.40	b 73	3.41	3.87	b 12.0	b1.150	b .267	29.060
	Aug.	6	4.4	23.16	68.74	68	5.43	3.39	8.29	43	b 4.21	4.16	7.3	.465	.114	29.082
	Dec.	5	4.7	a12.08	a31.40	b 81	a 1.98	1.24	10.44	b 63	3.51	4.23	b 11.4	b .947	b .244	29.082
Av.		4	3.7	17.84	48.49	75	3.61	2.26	9.42	54	3.95	4.31	10.1	.840	.203	29.053
Less than Av. Per Cent of Typho-mal. Fever.	July	3	4.5	a28.15	a73.30	b 63	a 5.90	3.69	7.99	b 29	b 3.33	b 4.07	b 8.2	b .411	b .109	a29.063
	Mar.	2	3.5	16.65	38.70	77	2.52	1.58	10.10	55	4.60	4.62	12.4	b .799	.221	29.042
	June	2	1.8	a22.70	a70.37	b 70	a 6.07	3.79	7.89	b 41	b 3.82	4.64	b 7.8	b .644	b .124	29.035
	Jan.	1	4.5	14.45	27.19	82	1.77	1.11	10.57	68	4.33	b 4.21	10.8	1.050	.293	a29.076
	Feb.	1	3.0	16.90	22.37	81	1.40	.88	10.80	57	4.68	4.86	11.7	1.447	.290	a29.087
	April	1	4.0	a17.86	46.90	b 73	3.12	1.95	9.73	54	4.23	4.62	b 9.8	.866	.217	a29.064
	May	1	3.3	a18.20	a55.24	76	a 4.16	2.60	9.08	60	4.60	5.03	10.5	.873	b .172	28.995

*, †, ‡, §, ‖, ¶, **. For foot-notes with these marks, see Exhibit X., page 123.
a An exception to Proposition 1, relating to Typhoid Fever and Typho-malarial Fever, on page 135.
b An exception to Proposition 2, relating to Typhoid Fever and Typho-malarial Fever, on page 135.

EXHIBIT XXIII.—MEASLES AND WHOOPING-COUGH.—*Stating for the Year and for each Month of the Year 1894, what Per Cent of the Weekly Reports of Sickness Stated Presence of Measles and Whooping-Cough and what were the Meteorological Conditions as observed at Stations in Michigan.**

MEASLES.			Temperature, F.		Humidity of Air. Av. of 3 Daily Observations.		Vapor Inhaled and Exhaled from the Air Passages by one Person in 24 Hours, Troy Ounces.		Ozone, Relative. Scale of 10°.			Atmospheric Pressure, Inches. Reduced to 32° F.			
Months in Order of Greatest Per Cent of Weekly Reports Stating Presence of.	Per Cent of Weekly Reports Stating Presence of.	Av. Order of Prevalence where Present. †, ‡.	Av. Daily Range by Registering Thermometers.	Average of Three Daily Observations.	Relative Per Cent of Saturation.	Absolute,—Grains of Vapor in a Cubic Foot of Air.	Inhaled.‖	Exhaled in excess of that Inhaled.¶	Average Per Cent of Cloudiness.	Day Observation, 7 A. M. to 2 P. M.	Night Observation, 9 P. M. to 7 A. M.	Av. Velocity of Wind, Miles per Hour by Anemometer.	Range. Monthly and for Year.	Range. Av. Daily, by 3 Daily Observations.**	Average Pressure.
More than Av. Per Cent of Measles.															
May	19	2.7	18.20	55.24	*b* 76	4.16	2.60	9.08	*b* 60	*b* 4.60	*b* 5.03	*b* 10.5	*b* .873	.172	*a*28.995
Apr.	15	2.5	17.86	*a*46.90	73	*a* 3.12	1.95	9.73	54	*b* 4.23	*b* 4.62	9.8	*b* .866	*b* .217	29.064
June	13	2.2	22.70	70.37	70	6.07	3.79	7.89	41	3.82	*b* 4.64	7.8	.644	.124	*a*29.035
Mar.	9	2.8	*a*16.65	*a*38.70	*b* 77	*a* 2.52	1.58	10.10	*b* 55	*b* 4.60	*b* 4.62	*b* 12.4	.799	*b* .221	*a*29.042
Av.	6	2.8	17.84	48.49	75	3.61	2.26	9.42	54	3.95	4.31	10.1	.840	.203	29.053
Less than Av. Per Cent of Measles.															
Feb.	5	2.1	16.90	22.37	81	1.40	.88	10.80	57	4.68	4.86	11.7	1.447	.290	*a*29.087
July	5	3.2	*a*23.15	*a*73.30	*b* 63	*a* 5.90	3.69	7.99	*b* 29	*b* 3.33	*b* 4.07	*b* 8.2	*b* .411	*b* .109	*a*29.063
Jan.	2	3.7	14.45	27.19	82	1.77	1.11	10.57	68	4.33	*b* 4.21	10.8	1.050	.293	*a*29.076
Aug.	2	3.6	*a*23.16	*a*68.74	*b* 68	*a* 5.43	3.39	8.29	*b* 43	4.21	*b* 4.16	*b* 7.3	*b* .465	*b* .114	*a*29.082
Dec.	2	5.0	12.08	31.40	81	1.98	1.24	10.44	63	*b* 3.51	*b* 4.23	11.4	.947	.244	*a*29.082
Sept.	1	5.0	*a*20.53	*a*64.45	*b* 74	*a* 5.32	3.33	8.35	*b* 41	*b* 3.37	*b*3.67	*b* 9.1	*b* .680	*b* .155	*a*29.089
Nov.	1	2.8	12.59	33.09	80	2.04	1.28	10.40	73	*b* 3.41	*b* 3.87	12.0	1.150	.267	*a*29.060
Oct.	0.4	1.0	15.76	*a*50.14	78	3.59	2.24	9.44	64	*b* 3.46	*b* 3.70	*b* 9.7	*b* .752	.230	28.961
WHOOPING-COUGH.															
More than Av. Per Ct. of Whooping cough.															
Nov.	14	2.2	*a*12.59	*a*33.09	*b* 80	*a* 2.04	1.28	10.40	*b* 73	3.41	3.87	*b* 12.0	*b*1.150	*b* .267	29.060
Dec.	14	2.2	*a*12.08	*a*31.40	*b* 81	*a* 1.98	1.24	10.44	*b* 63	3.51	4.23	*b* 11.4	*b* .947	*b* .244	29.082
Aug.	13	2.6	23.16	68.74	68	5.43	3.39	8.29	43	*b* 4.21	4.16	7.3	.465	.114	29.082
Sept.	13	3.4	20.53	64.45	74	5.32	3.33	8.35	41	3.37	3.67	9.1	.680	.155	29.089
Oct.	13	2.4	*a*15.76	50.14	*b* 78	*a* 3.59	2.24	9.44	*b* 64	3.46	3.70	9.7	.752	*b* .230	*a*28.931
Av.	12	2.9	17.84	48.49	75	3.61	2.26	9.42	54	3.95	4.31	10.1	.840	.203	29.053
Less than Av. Per Cent of Whooping-cough.															
Apr.	12	3.6	*a*17.86	46.90	*b* 73	3.12	1.95	9.73	54	4.23	4.62	*b* 9.8	.866	.217	*a*29.064
May	12	3.6	*a*18.20	*a*55.24	76	*a* 4.16	2.60	9.08	60	4.60	5.03	10.5	.873	*b* .172	28.995
June	12	3.0	*a*22.70	*a*70.37	*b* 70	*a* 6.07	3.79	7.89	*b* 41	*b* 3.82	4.64	*b* 7.8	*b* .644	*b* .124	29.035
July	12	3.2	*a*23.15	*a*73.30	*b* 63	*a* 5.90	3.69	7.99	*b* 29	*b* 3.33	*b* 4.07	*b* 8.2	*b* .411	*b* .109	*a*29.063
Jan.	8	2.9	14.45	27.19	82	1.77	1.11	10.57	68	4.33	*b* 4.21	10.8	1.050	.293	*a*29.076
Feb.	8	3.0	16.90	22.37	81	1.40	.88	10.80	57	4.68	4.86	11.7	1.447	.290	*a*29.087
Mar.	8	2.5	16.65	38.70	77	2.52	1.58	10.10	55	4.60	4.62	12.4	*b* .799	.221	29.042

*, †, ‡, §, ‖, ¶, **. For foot-notes with these marks, see Exhibit X., page 123.
a An exception to Proposition 1, relating to Measles and Whooping-Cough on page 135.
b An exception to Proposition 2, relating to Measles and Whooping-Cough on page 135.

EXHIBIT XXIV.—CHOLERA MORBUS AND DYSENTERY.—*Stating for the Year and for each Month of the Year 1894, what Per Cent of the Weekly Reports of Sickness Stated Presence of Cholera Morbus and Dysentery, and what were the Meteorological Conditions as observed at Stations in Michigan.**

CHOLERA MORBUS.				Temperature, F.		Humidity of Air.§ Av. of 3 Daily Observations.		Vapor Inhaled and Exhaled from the Air Passages by one Person in 24 Hours, Troy Ounces.		Average Per Cent of Cloudiness.	Ozone, Relative. Scale of 10°.		Av. Velocity of Wind, Miles per Hour by Anemometer.	Atmospheric Pressure, Inches. Reduced to 32° F.		
Months in Order of Greatest Per Cent of Weekly Reports Stating Presence of.	Per Cent of Weekly Reports Stating Presence of.	Av. Order of Prevalence where Present. †‡		Av. Daily Range by Registering Thermometers.	Average of Three Daily Observations.	Relative Per Cent of Saturation.	Absolute,—Grains of Vapor in a Cubic Foot of Air.	Inhaled.‖	Exhaled in excess of that Inhaled.¶		Day Observation, 7 A. M. to 2 P. M.	Night Observation, 9 P. M. to 7 A. M.		Range. Monthly and for Year.	Range. Av. Daily, by 3 Daily Observations.**	Average Pressure.
More than Av. Per Ct. of Cholera Morbus.																
Aug.	38	2.7	23.16	68.74	68	5.43	3.39	8.29	43	b 4.21	4.16	7.3	.465	.114	29.082	
Sept.	37	3.3	20.53	64.45	74	5.32	3.33	8.35	41	3.37	3.67	9.1	.680	.155	29.089	
July	27	2.7	23.15	73.30	63	5.90	3.69	7.99	29	3.33	4.07	8.2	.411	.109	29.063	
Av.	14	3.3	17.84	48.49	75	3.61	2.26	9.42	54	3.95	4.31	10.1	.840	.208	29.053	
Less than Av. Per Cent of Cholera Morbus.																
June	14	3.3	a22.70	a70.37	b 70	a 6.07	3.79	7.89	b 41	b 3.82	4.64	b 7.8	b .644	b .124	29.035	
Oct.	13	3.6	15.76	a50.14	78	3.59	2.24	9.44	64	b 3.46	b 3.70	b 9.7	b .752	.230	28.961	
May	8	3.7	a18.20	a55.24	76	a 4.16	2.60	9.08	60	4.60	5.03	10.5	.873	b .172	28.995	
April	6	5.1	a17.86	46.90	b 73	3.12	1.95	9.73	54	4.23	4.62	b 9.8	.866	.217	a29.064	
Nov.	5	2.9	12.59	33.09	80	2.04	1.28	10.40	73	b 3.41	b 3.87	12.0	1.150	.267	a29.060	
Dec.	4	4.5	12.08	31.40	81	1.98	1.24	10.44	63	b 3.51	b 4.23	11.4	.947	.244	a29.082	
Mar.	3	4.1	16.65	38.70	77	2.52	1.58	10.10	55	4.60	4.62	12.4	b .799	.221	29.042	
Jan.	2	4.3	14.45	27.19	82	1.77	1.11	10.57	68	4.33	b 4.21	10.8	1.050	.293	a29.076	
Feb.	1	4.3	16.90	22.37	81	1.40	.88	10.80	57	4.68	4.86	11.7	1.447	.290	a29.087	
DYSENTERY.																
More than Av. Per Cent of Dysentery.																
Sept.	40	3.0	20.53	64.45	74	5.32	3.33	8.35	41	3.37	3.67	9.1	.680	.155	29.089	
Aug.	38	3.0	23.16	68.74	68	5.43	3.39	8.29	43	b 4.21	4.16	7.3	.465	.114	29.082	
July	20	3.3	23.15	73.30	63	5.90	3.69	7.99	29	3.33	4.07	8.2	.411	.109	29.063	
Oct.	20	3.0	a15.76	50.14	b 78	a 3.59	2.24	9.44	b 64	3.46	3.70	9.7	.752	b .230	a28.961	
Av.	14	3.3	17.84	48.49	75	3.61	2.26	9.42	54	3.95	4.31	10.1	.840	.208	29.053	
Less than Av. Per Cent of Dysentery.																
Nov.	9	3.6	12.59	33.09	80	2.04	1.28	10.40	73	b 3.41	b 3.87	12.0	1.150	.267	a29.060	
June	7	3.9	a22.70	a70.37	b 70	a 6.07	3.79	7.89	b 41	b 3.82	4.64	b 7.8	b .644	b .124	29.035	
Jan.	5	5.0	14.45	27.19	82	1.77	1.11	10.57	68	4.33	b 4.21	10.8	1.050	.293	a29.076	
May	5	4.2	a18.20	a55.24	76	a 4.16	2.60	9.08	60	4.60	5.03	10 5	.873	b .172	28.995	
Mar.	4	2.7	16.65	38.70	77	2.52	1.58	10.10	55	4.60	4.62	12.4	b .799	.221	29.042	
April	4	4.1	a17.86	46.90	b 73	3.12	1 95	9.73	54	4.23	4.62	b 9.8	.866	.217	a29.064	
Dec.	4	5.0	12.08	31.40	81	1.98	1.24	10.44	63	b 3.51	b 4.23	11.4	.947	.244	a29.082	
Feb.	2	2.8	16.90	22.37	81	1.40	.88	10.80	57	4.68	4.86	11.7	1.447	.290	a29.087	

*, †, ‡, §, ‖, ¶, **. For foot-notes with these marks, see Exhibit X., page 123.
a An exception to Proposition 1, relating to Cholera Morbus and Dysentery on page 135.
b An exception to Proposition 2, relating to Cholera Morbus and Dysentery on page 135.

COLD-WEATHER DISEASES.

EXHIBIT XXV.—*Summary relative to Propositions contained in Exhibits X., XII., XIV., XV., XVI., etc. (pages 123-142), concerning Relations by Months, in 1894, between Greater or Less than Usual Prevalence of Diseases Named, and Certain given Coincident Climatic Conditions.*

Diseases.	Months (inclusive) in which Diseases named were more than Usually Prevalent in 1894. *	Months (inclusive) in which Diseases named were less than Usually Prevalent in 1894.	For the 12 months of the year 1894. Number of Months in which Propositions hold true.*										
			That in Months when Diseases named were more than usually prevalent the conditions named below were Greater than usual, and in Months when Less than usually prevalent these conditions were Less than usual.†							That in Mos. when Diseases named were more than usually prevalent the conditions named below were Lower than usual, and in mos. when the Diseases were Less than usually prevalent these conditions were higher than usual.†			
			Relative Humidity.	Av. Per Cent of Cloudiness.	Ozone.		Velocity of Wind.	Atmospheric Pressure.		Average Temp.	Av. Daily Range of Temperature.†	Av. Daily Atmospheric Pressure.†	Absolute Humidity.
					Day.	Night.		Range.					
								Monthly.	Av. Daily.				
Bronchitis	Jan.-Apr., Oct.-Dec.	May-Sept.	10	11	7	6	9	9	12	11	11	5	12
Pneumonia	Jan.-May, Nov., Dec.	June-Oct.	10	11	9	8	11	11	10	11	9	5	10
Membran. Croup.	Oct., Nov., Jan., May.	Feb.-Apr., June-Sept., Dec.	9	9	6	5	8	8	7	6	8	8	7
Diphtheria	Feb., Mar., Sept.-Dec.	Jan., Apr.-Aug.	9	9	4	5	8	6	9	8	10	6	9
Tonsillitis	Jan.-May, Nov., Dec.	June-Oct.	10	11	9	8	11	11	9	11	9	5	10
Influenza	Jan.-Apr., Dec.	June-Nov.	8	9	9	8	9	9	10	11	9	5	10
Scarlet Fever	Apr.-June, Oct.-Dec.	Jan.-Mar., July-Sept.	7	8	4	7	6	8	7	6	6	8	7
Rheumatism	Jan.-May, Nov., Dec.	June-Oct.	10	11	9	8	11	11	10	11	9	5	10
Neuralgia	Jan.-May, Nov.	June-Oct., Dec.	9	10	10	9	10	10	9	10	8	6	9
Consumption	Apr.-July, Sept.	Jan.-Mar., Aug., Oct.-Dec.	2	3	5	8	3	5	2	3	1	7	2
Pleuritis	Jan.-May, Nov.	June-Oct., Dec.	9	10	10	9	10	10	9	10	8	6	9
Average Disease	Sept.	Jan.-Aug., Oct.-Dec.	4	4	5	6	5	5	4	5	5	7	4

* The figures in each of these 11 columns show for how many months out of the twelve months in 1894, the proposition named over the column holds true, thus, concerning bronchitis, the proposition relative to average daily range of temperature held true in only two months out of the twelve; that relative to average temperature, in eleven out of twelve, etc.

† The statements relative to the average daily range of temperature and the average daily pressure of the atmosphere were taken from Proposition 1 and inserted in Proposition 2 in the statistical study of sickness in Michigan in 1893, Annual Report for 1894. These propositions are printed on pages 120 and 121 of this Report.

Warm-Weather Diseases.

EXHIBIT XXVI.—*Summary Relative to Propositions contained in Exhibits XIX., XXI., etc, (pages 136–142, etc.), concerning Relations, by Months in 1894, between Greater or Less than Usual Prevalence of Diseases Named, and Certain given Coincident Climatic Conditions.*

Diseases.	Months (inclusive) in which Diseases named were more than Usually Prevalent in 1894.	Months (inclusive) in which Diseases named were less than Usually Prevalent in 1894.	For the 12 Months of the Year 1894. Number of Months in which Propositions hold true.*										
			That in Months when Diseases named were More Prevalent than Usual the Conditions named below were Higher than Usual, and in Months when the Diseases were less Prevalent than Usual these Conditions were lower than Usual.				That in Months when Diseases named were More Prevalent than Usual the Conditions named below were less than Usual, and in Months when the Diseases were less Prevalent than Usual these Conditions were Greater than Usual.						
			Average Temperature.	Av. Daily Range of Temp.	Absolute Humidity.	Atmospheric Pressure. Av. Daily Pressure.	Atmospheric Pressure. Range. Monthly.	Atmospheric Pressure. Range. Av. Daily.	Relative Humidity.	Av. per Cent of Cloudiness.	Ozone. Day.	Ozone. Night.	Velocity of Wind.
Diarrhea	July-Oct.	Jan.-June, Nov., Dec.	10	8	9	6	10	9	9	10	8	9	10
Cholera Infantum	July-Oct.	Jan.-June, Nov., Dec.	10	8	9	6	10	9	9	10	8	9	10
Intermittent Fever.	Mar., June-Oct.	Jan., Feb., Apr., May, Nov., Dec.	10	8	9	4	12	9	9	10	8	7	10
Remittent Fever	Aug.-Dec.	Jan.-July	7	5	6	7	7	6	6	7	9	10	7
Typhoid Fever	Aug.-Dec.	Jan.-July	7	5	6	7	7	6	6	7	9	10	7
Typho-mal. Fever	Aug.-Dec.	Jan.-July	7	5	6	7	7	6	6	7	9	10	7
Measles	Mar.-June	Jan., Feb., July-Dec.	6	8	7	2	6	7	7	7	4	1	6
Whooping-cough	Aug.-Dec.	Jan.-July	7	5	6	7	7	6	6	7	9	10	7
Cholera morbus	July-Sept.	Jan.-June, Oct.-Dec.	9	9	10	7	9	10	10	11	7	8	9
Dysentery	July-Oct.	Jan.-June, Nov., Dec.	10	8	9	6	10	9	9	10	8	9	10

* The figures in each of these 11 columns show for how many months out of the twelve months in 1894 the proposition named over the column holds true; thus, concerning diarrhea, the proposition relative to average daily range of temperature held true in eight months out of the twelve; that relative to absolute humidity nine months out of the twelve, etc.

TOTAL SICKNESS—AVERAGE DISEASE.

"Average disease" is an average of the tabulated diseases reported present on all the cards received and compiled at this office during the year. It is probably equivalent to the actual sickness from all diseases printed on the report cards, and probably represents very nearly the average sickness from all the diseases in the State. A sample of the report cards on which diseases are reported to this office is found on page 83. Twenty-eight diseases are printed on the cards. In 1894 there were 5,572 of these card reports received. On some of the cards only one or two diseases were reported present; on others twenty or more were reported present. Had each disease (printed on this card, and only the twenty-eight thus named) been reported present on every card received at this office, there would have been 156,016 reports of diseases present. (This is the product of 5,572 reports received multiplied by 28, the number of diseases printed on the cards, or 100 per cent of the possible disease reports.) There were actually present on the cards received at this office only 30,619 disease reports which 30,619÷156,016 of the possible disease reports that might have been present, is 20 per cent. This 20 per cent represents the actual sickness in the State from the tabulated diseases reported present, or in other words the sickness from "average disease." (See Diagram 4, page 133.)

Exhibit XXVII. serves to indicate the probable actual sickness in the State from the tabulated diseases in each year from 1877 to 1894. It compares the sickness in 1894 by months with the sickness by months in each of the seventeen years, 1877–1893. It also compares the sickness in 1894, by months with the sickness, by months, in each of the eight years, 1886–1893. This last comparison is made because of the change in the plan of reports, which occurred in May, 1885, since which time the plan has been to have reported only the sickness actually observed by the physician who reports. Previous to May, 1885, some reported sickness that, by conference with other physicians, they believed to have occurred. Since May, 1885, the subject is placed upon a scientific basis.

By Exhibit XXVII., it will be seen that the sickness reported in 1894, was, for the year, and for each month of the year, considerably less than the average reported for the seventeen years, 1877–93. That exhibit also shows that the sickness reported in Michigan for the year 1894, and for each month was less than the average for the eight years, 1886–1893.

On this subject Exhibits A and B, on pages 112 and 113, and the accompanying remarks, may be studied in connection with the exhibits and remarks in this part of this article. In Exhibit A., the order of prevalence of each disease, including the "Average Disease," is shown as it appears after taking account of the order of prevalence of each disease in the places where it was present, and also the per cent of all reports received on which that disease was reported.

RELATIONS OF TOTAL AMOUNT OF SICKNESS TO METEOROLOGICAL CONDITIONS.

PROPOSITION 1.—That in months when more than the average per cent of weekly reports stated the presence of such of the 28 diseases tabulated (in tables on pages 97–111) as were reported present, the relative humidity of the atmosphere, the average per cent of cloudiness, the ozone, the average velocity of the wind, the monthly and the average

daily range of the barometer, were greater than the average for the year; and in months when less than the average per cent of reports stated the presence of said diseases those conditions were less than the average for the year. In Exhibit XXVIII., page 147, the letter *a* marks exceptions to this proposition for the year 1894.

EXHIBIT XXVII.—SICKNESS FROM AVERAGE DISEASE, 1887–94.—*By Year and Months for each of the Seventeen Years, 1877–93, Stating on an average for such of the 28 diseases tabulated as were reported present, what Per Cent of the Weekly Reports received stated presence of the Diseases, and comparing the Average Per Cents for Months in 1894, with the Averages for corresponding Months in the Years 1877–93; also comparing the Averages for the Months in 1894 with the Averages for corresponding months in the six Years, 1886–1893.**

Years, etc.	Annual Av.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Average 17 years, 1877-93	27	28	28	28	28	26	25	27	29	30	28	27	27
Average 8 years, 1886-93	24	25	25	25	25	23	22	23	26	25	24	23	24
1877	28	27	28	26	24	24	23	26	29	31	30	30	30
1878	30	30	30	31	29	28	26	28	32	35	34	30	32
1879	33	35	36	36	35	30	30	32	37	36	34	34	33
1880	32	32	32	32	31	30	31	34	36	35	32	30	31
1881	33	34	34	32	35	31	30	34	37	36	35	32	31
1882	30	31	30	30	30	29	28	28	30	34	32	31	29
1883	30	30	31	33	33	31	29	29	32	32	29	29	28
1884	29	28	29	30	28	28	29	31	34	34	33	30	29
1885	26	29	29	30	28	25	24	26	27	27	26	26	26
1886	26	26	26	28	27	26	23	26	27	28	25	25	25
1887	25	26	27	28	26	25	24	27	29	26	25	24	24
1888	24	24	26	27	26	24	23	22	25	25	23	22	23
1889	23	23	22	24	23	23	21	24	27	28	26	23	22
1890	25	26	26	25	26	25	23	24	27	26	25	25	27
1891	25	27	27	27	27	25	22	23	26	25	24	23	24
1892	21	26	25	24	24	20	19	19	22	23	22	20	23
1893	20	21	21	20	20	19	18	18	21	21	20	20	20
1894 (Diagram 4, page 133)	20	20	19	20	20	19	18	18	20	22	20	19	19
In 1894 Less than Average 1877-93	7	8	9	8	8	7	7	9	9	8	8	8	8
In 1894 Less than Average 1886-93*	4	5	6	5	5	4	4	5	6	3	4	4	5

* This last comparison is made because of the change in the plan of making the reports, which occurred in May, 1885, as explained on pages 82–83.

PROPOSITION 2.—That in months when more than the average per cent of weekly reports stated the presence of such of the twenty-eight diseases tabulated as were reported present, the average daily temperature, the average daily range of temperature*, the absolute humidity of the atmos-

phere, and the average daily pressure of the atmosphere*, were less than the average for the year; and in months when less than the average per cent of reports stated the presence of said diseases those conditions were greater than the average for the year. In Exhibit XXVIII., page 147, the letter *b* marks exceptions to this proposition for the year 1894.

What per cent of the weekly reports received in 1894 (on an average for such of the tabulated diseases as were reported present) stated presence of the diseases is graphically represented by months in Diagram 4, page 133.

Exhibit XXVIII., continued for a series of years, should show what meteorological conditions are on the whole most conducive to health in Michigan, and what are most to be guarded against by residents of Michigan.

EXHIBIT XXVIII.—AVERAGE DISEASE.—*Stating for the Year and for each Month of the Year 1894, what Per Cent of the Weekly Reports of Sickness Stated Presence of Average Disease and what were the Meteorological Conditions as observed at Stations in Michigan.**

Average Disease.				Temperature, F.		Humidity of Air.§ Av. of 3 Daily Observations.		Vapor Inhaled and Exhaled from the Air Passages by one Person in 24 Hours, Troy Ounces.		Cloudiness.	Ozone, Relative. Scale of 10°.		Velocity of Wind, Miles per Hour by Anemometer.	Atmospheric Pressure, Inches, Reduced to 32° F.		
	Months in Order of Greatest Per Cent of Weekly Reports Stating Presence of.	Per Cent of Weekly Reports Stating Presence of.	Av. Order of Prevalence where present.†, ‡.	Av. Daily Range by Registering Thermometers.	Average of Three Daily Observations.	Relative Per Cent of Saturation.	Absolute,—Grains of Vapor in a Cubic Foot of Air.	Inhaled.‖	Exhaled in excess of that Inhaled.¶	Average Per Cent of Cloudiness.	Day Observation, 7 A. M. to 2 P. M.	Night Observation, 9 P. M. to 7 A. M.		Range. Monthly and for year.	Range. Av. Daily, by 3 Daily Observations.**	Average Pressure.
More than Av. Per Ct. of Av. Disease.	Sept.	22	3.2	*b*20.53	*b*64.45	*a* 74	*b* 5.32	3.33	8.35	*a* 41	*a* 3.37	*a* 3.67	*a* 9.1	*a* .680	*a* .155	*b*29.089
Av.		20	3.0	17.84	48.49	75	3.61	2.26	9.42	54	3.95	4.31	10.1	.840	.203	29.053
Less than Average Per Cent of Average Disease.	Jan.	20	3.2	*b*14.45	*b*27.19	*a* 82	*b* 1.77	1.11	10.57	*a* 68	*a* 4.33	4.21	*a* 10.8	*a*1.050	*a* .293	29.076
	Mar.	20	3.1	*b*16.65	*b*38.70	*a* 77	*b* 2.52	1.58	10.10	*a* 55	*a* 4.60	*a* 4.62	*a* 12.4	.799	*a* .221	*b*29.042
	April	20	3.2	17.88	*b*46.90	73	*b* 3.12	1.95	9.73	54	*a* 4.23	*a* 4.62	9.8	*a* .866	*a* .217	29.064
	Aug.	20	3.0	23.16	68.74	68	5.43	3.39	8.29	43	*a* 4.21	4.16	7.3	.465	.114	29.082
	Oct.	20	2.9	*b*15.76	50.14	*a* 78	*b* 3.59	2.24	9.44	*a* 64	3.46	3.70	9.7	.752	*a* .230	*b*28.961
	Feb.	19	3.2	*b*16.90	*b*22.37	*a* 81	*b* 1.40	.88	10.80	*a* 57	*a* 4.68	*a* 4.86	*a* 11.7	*a*1.447	*a*.290	29.087
	May	19	3.1	18.20	55.24	*a* 76	4.16	2.60	9.08	*a* 60	*a* 4.60	*a* 5.03	*a* 10.5	*a* .873	.172	*b*28.995
	Nov.	19	3.0	*b*12.59	*b*33.09	*a* 80	*b* 2.04	1.28	10.40	*a* 73	3.41	3.87	*a* 12.0	*a*1.150	*a* .267	29.060
	Dec.	19	3.0	*b*12.08	*b*31.40	*a* 81	*b* 1.98	1.24	10.44	*a* 63	3.51	4.23	*a* 11.4	*a* .947	*a* .244	29.082
	June	18	2.8	22.70	70.37	70	6.07	3.79	7.89	41	3.82	*a* 4.64	7.8	.644	.124	*b*29.035
	July	18	2.8	23.15	73.30	63	5.90	3.69	7.99	29	3.33	4.07	8.2	.411	.109	29.063

*, †, ‡, §, ‖, ¶, **. For foot-notes with these marks, see Exhibit X., page 123.
a An exception to Proposition 1, relating to Average Disease, on page 145-6.
b An exception to Proposition 2, relating to Average Disease, on page 146-7.

*The statements relative to the average daily range of temperature and the average daily pressure of the atmosphere were taken from Proposition 1 and inserted in Proposition 2 in the statistical study of sickness in Michigan in 1893, Annual Report for 1894.

COMMUNICABLE DISEASES IN MICHIGAN DURING THE YEAR ENDING DECEMBER 31, 1894.

COMPILED UNDER THE DIRECTION OF THE SECRETARY OF THE STATE BOARD OF HEALTH.

This paper continues a subject treated for the preceding year on pages 149–396 of the Report of the State Board of Health for the year 1894, and for former years in the Reports for those years respectively.

Whenever information is received at this office of the outbreak (in any locality in Michigan) of diphtheria, scarlet fever, typhoid fever, consumption, small-pox, measles, German measles (rötheln), whooping-cough, rabies or glanders, a letter is sent to the health officer of the township, city or village in which the disease is reported to be present (if the name of the health officer has been reported to this office; if not to the president of the board of health), calling his attention (if the report was not received from him) to the reported existence of the disease within his territory, indicating his duties and powers and the proper measures to be taken in restricting the disease, transmitting documents of instruction with regard to prevention and restriction of the disease, for distribution among families especially exposed to it,* and asking for a report of the methods employed for the restriction of the disease, and the results of efforts for suppressing it, also the number of cases and deaths in each outbreak. In the case of typhoid fever, a printed letter was used (form [162.]) which is reproduced in Part I. of the Report of this Board for 1894, p. lxxxvi. In the case of measles a hektographed letter was used. In the case of diphtheria, scarlet fever, and small-pox the letter generally sent during the year 1894 was substantially the same as that printed on pages 251–252 of the Report of the State Board of Health for the year 1884, except that about a dozen questions were added. With this letter in each instance, there was sent a blank form (L) for the notice of the first case of a dangerous communicable disease, and a blank form (M) for weekly reports during the continuance of the disease. After the outbreak was over, there was sent a blank form (K) or (O) for special final report. Blanks (L) and (M) now in use are substantially the same as those printed on pages 253–254 of the Report for 1884. The blank (K) for final report is printed on pages xiii–xiv of the Report of this Board, for 1888; but the present blank is more complete. The blank (O) is for typhoid fever, and was first used

* It is believed that these documents distributed in this manner are doing great good; for the neighbors of the sick are sufficiently alarmed to read the documents, and are thus led to co-operate in stamping out the disease.

Some evidence of the value of this work may be seen further on in this article, in tables which show the estimated number of outbreaks of, and cases of sickness from communicable diseases prevented, and lives saved by isolation and disinfection.

in September, 1890. Since that date it has been modified; as at present used it is as follows, after the next paragraph.

The information contained in the above-mentioned blanks and those supplied to health officers and clerks of townships, cities and villages, for their annual reports, when filled and returned to this office by the health officers of localities where dangerous communicable diseases have existed, together with other correspondence in regard to outbreaks of such diseases, are the bases on which the various statements made in this article are founded.

[O] FINAL REPORT RELATIVE TO TYPHOID FEVER.

[DO NOT FILL OUT AND RETURN THIS UNTIL THE OUTBREAK IS OVER.]

_____P. O.,_____Co., Mich.
_____189____

To the Secretary of the Michigan State Board of Health, Lansing, Mich.:

1. This disease was called by the attending physician*_____ (Name the disease.)
2. All the cases included in this report occurred in the_____ (Township, City or Village.) of _____ (Name of Township, etc.) County of_____Michigan.
3. The mode of introduction of the disease into my jurisdiction, was as follows:_____ (See remarks concerning this question in the printed letter.)
4. The origin of this outbreak of disease was as follows:_____
5. If any beside the first case were sick with typhoid fever, how did they contract the disease?_____
6. The first case was taken sick_____189____. (Give date.) The last case died or was recovered_____189____. (Give date.)
7. At the beginning of this outbreak, in how many households was this disease?_____
8. At the close of this outbreak, in how many households has this disease been?_____
9. In this outbreak there have been_____ (Number.) cases in my jurisdiction of which_____ (Number.) died.
10. Previous to being taken sick, what was the ordinary source of drinking water of the first person taken sick in this outbreak? From a well?_____. From a general water supply?_____
11. If from a well, how many privies are within one hundred feet of this well?_____
12. Has there been any sickness from *any fever* during the last twelve months in any of the persons using one of these privies?_____. If so, what was the fever?_____
13. How much more or less than the usual depth of water was there in the well just previous to, or at the time of the beginning of this outbreak?_____
14. Was water from some other source drank about seven to fourteen days previous to beginning of sickness?_____
15. When (how many months or years ago) was there a case of typhoid fever on the premises where the first case of this outbreak occurred?_____
16. In this outbreak were all the bowel discharges, of all the sick, disinfected before being removed from the house?_____. For which patient was this done?_____. On what day of the sickness was it begun?_____ How much of what disinfectant was used for each discharge?_____
17. What was done with the bowel discharges from each of the patients?_____
18. How much of what disinfectant was used in the privy vault used by the patient?_____. How many cubic feet of excreta are now in the privy vault?_____
19. Was the clothing or bedding which was soiled by the discharges of the patient thoroughly disinfected?_____. For which of the patients was this done?_____

* Typhoid fever, typho-malarial fever, continued fever, etc., as the case may be.

20. Was the room which the patient occupied while sick, together with its contents, disinfected with burning sulphur?_____. If so, how much sulphur was burned?_____lbs., which was about_____lbs. per thousand cubic feet of air space. For which of the patients was this done?_____
21. Was everything which came in contact with a sick person destroyed by fire, or disinfected thoroughly?_____. How?_____
22. Was the water from the wells on or near the infected premises boiled before being drank?_____. If so, when was the use of boiled water commenced?_____. How long continued?_____
23. What else was done to restrict the spread and prevent the reappearance of the disease?_____
24. After the first person was taken sick what exceptions were there to the complete accomplishment of the foregoing measures,—disinfection of excreta, boiling of water drank, etc.?_____
25. In this outbreak how many of the cases can you trace to a previous case?_____
26. The evidences of success attending the efforts at restriction were:_____
27. The following facts bear on the subject of the period of incubation:_____

Very respectfully,

(Name.)

(Please state whether Health Officer, President or Clerk.)

Of the Board of Health of_____
(Name of City, Village or Township, and state which.)

Note.—Relative to "Special Final Reports" and the Disinfection which the Law Requires shall be Done by the Health Officer.

The answers to the questions in this blank are important for the purpose of acquiring a correct knowledge of how typhoid fever is spread; and it is suggested that while the health officer is on the premises where the first case occurred, that he make a memorandum of the circumstances, or fill in the answers on this sheet, as he will then be able to question the members of the family relative to such answers as he himself cannot supply.

These final reports, when properly filled out, are of great value in determining the best methods for preventing and restricting communicable diseases, but omissions in them sometimes detract greatly from their value. It is almost impossible to compile from letters and postals, but if the desired information is in its proper place on this blank form, its compilation is practicable.

It is especially important that we learn whether or not the fumigation by burning sulphur is efficient as a disinfectant, and what quantity of sulphur is required to accomplish disinfection. *The law* (Act 137, Laws of 1883) *requires the health officers to disinfect*, therefore it is impossible in every case for the health officer to know just how it was done, and how much sulphur was used; but if the exact quantity "per thousand cubic feet of air-space" cannot be stated, an estimate of the quantity used for each room should be made and stated in the report in connection with the statements of the length, breadth and height of each room fumigated.

In this report, a prepared space not filled by you cannot be compiled the same as if filled with a "0," because, if left blank it indicates that the item has been overlooked.

After the close of the outbreak, will you have the kindness to fill all the spaces in this "final report blank," making the statements as complete and exact as possible, and return the report to this office?

This report is asked for under the law which requires special reports to be made by the health physicians, when they are asked for by the State Board of Health.

Very respectfully,

HENRY B. BAKER,
Secretary.

TABLE 1.—*Number of Places in Michigan at which Communicable Diseases were Reported Present During each Week in 1894.*

Weeks ending :—	Diphtheria.	Scarlet Fever.	Typhoid Fever.	Measles.	Small-pox.	Consumption.
January 6	24	41	21	10	0	
January 13	26	49	25	6	0	
January 20	23	46	26	9	0	
January 27	26	50	28	10	1	
February 3	38	58	26	12	1	
February 10	26	52	28	15	2	
February 17	25	53	18	15	2	
February 24	26	56	17	17	3	
March 3	28	53	11	14	3	
March 10	28	46	13	13	2	
March 17	37	51	18	18	3	
March 24	32	54	14	19	4	
March 31	28	47	14	22	4	
April 7	28	46	15	25	3	
April 14	19	63	14	28	4	
April 21	21	49	10	27	3	
April 28	30	45	15	48	4	220
May 5	31	56	15	63	3	207
May 12	25	50	15	68	4	213
May 19	23	49	14	53	5	223
May 26	26	40	12	48	5	218
June 2	30	44	17	61	5	220
June 9	26	45	11	45	5	230
June 16	28	46	12	47	11	219
June 23	28	47	15	46	13	218
June 30	23	42	21	32	10	220
July 7	21	44	18	23	12	223
July 14	18	29	21	21	8	224
July 21	15	29	23	20	7	227
July 28	18	31	28	14	7	229
August 4	17	33	22	9	3	229
August 11	19	38	33	10	3	231
August 18	20	35	43	6	2	233
August 25	23	38	44	4	2	233
September 1	23	30	47	4	1	234
September 8	31	37	58	6	1	234
September 15	25	40	61	5	1	234
September 22	30	32	64	4	2	237
September 29	33	41	71	2	2	236
October 6	32	45	90	2	3	236
October 13	33	40	80	2	3	235
October 20	33	40	65	3	4	234
October 27	38	53	79	6	4	233
November 3	29	54	69	8	6	233
November 10	37	50	71	5	5	231
November 17	36	52	50	5	6	231
November 24	44	48	48	4	8	229
December 1	45	63	57	6	7	229
December 8	41	65	43	10	8	228
December 15	42	70	33	8	9	228
December 22	49	65	24	6	9	228
December 29	46	57	21	5	8	228
Average number of places per week...	29	47	33	19	4	227

It is probable that every case of small-pox is reported to the Secretary of the State Board of Health; but that cannot yet be said of any other of the diseases in Table 1. Named in the order of most complete reports, probably these diseases would be arranged as follows: Small-pox, scarlet fever, diphtheria, typhoid fever, measles, consumption.

Some of the Purposes of this Compilation.

The object in having the data contained in the various reports received at the office of the Secretary compiled, tabulated and published is twofold: First, that facts relative to the ways whereby dangerous communicable diseases are spread in Michigan, and how they are sometimes restricted, and other useful facts, may be submitted to the people of the State, knowledge of which, it is hoped, will enable them to avoid or combat such diseases; and second, by the collation of such data to aid in the progress of sanitary science, especially in as far as it bears on the study of the cause and prevention of dangerous communicable diseases in Michigan.

In furtherance of these objects, the attempt has been made in this, as in previous Reports, to publish useful information relative to dangerous communicable diseases in this State, on the following points:—(1) The diseases which cause the most sickness and deaths; (2) To what extent those diseases prevail; (3) The methods of introduction and spread of those diseases; (4) The period of incubation of each of those diseases; (5) The average duration of each disease after contraction; (6) The season of the year at which each of such diseases is most prevalent and likely to be contracted; (7) The age at which persons are most likely to contract each disease; (8) The age at which there is greatest danger of persons dying from each disease; (9) The comparative susceptibility of the sexes to contraction of each disease; (10) The localities in the State where each disease is known to be usually most prevalent; (11) Whether or not each disease is more prevalent in large centers of population than in the more sparsely populated rural districts; (12) The comparative mortality from each disease; (13) The death-rate and the sickness-rate from each disease; (14) The best measures for the prevention and for the restriction of each disease; (15) Results of efforts made for the prevention and restric- of each disease; (16) The usual vehicles of transmission in each disease; (17) The results of neglect of restrictive measures in outbreaks of each disease; and, (18) The efficacy of isolation and disinfection in each disease.

The increasingly large number of replies received in answer to communications relative to contagious diseases, the general desire manifested by health officers for documents on the restriction of communicable diseases, and the general care taken to send complete reports to this office, show an increasing interest among the people, and a commendable effort on the part of the local health authorities to have every means employed to prevent the spread of communicable diseases. The number of communications which annually pass to and from this office relative to dangerous communicable diseases, has increased greatly during the last few years.

Persistent efforts of this Board have been directed toward impressing the people of the State with the necessity of adopting restrictive measures,—isolation and disinfection, in outbreaks of communicable diseases.

As intimated above, these efforts have been productive, among the people and health officials of the State, of increased interest in sanitary reforms, much, however, is still to be desired in that direction.

Definition of the Term "Outbreak," as Used in this Article.

For studying the influence of isolation and disinfection in restricting outbreaks of communicable diseases, an outbreak is considered as the existence of one or more cases of a particular communicable disease, within any health officer's jurisdiction, whether city, village, or township. All cases of the disease occurring within the jurisdiction during the outbreak are considered as part of the outbreak, unless the contagium cannot be traced to cases within the jurisdiction, and can be clearly traced to cases outside of the jurisdiction, in which instance they are considered as constituting a separate outbreak. Heretofore when a period of sixty days or over has elapsed since the last case (in a given jurisdiction) died or recovered, the outbreak has been considered ended. Possibly the sixty-days limit may be changed to ninety days; but in order to study the subject systematically, there must be a limit in time, as also in area.

Restriction of Diphtheria, Scarlet Fever, Typhoid Fever and Measles.

Relative to outbreaks of diphtheria and scarlet fever during the five years 1886 to 1890, the results of isolation and disinfection have previously been shown in a diagram heretofore published by this Board. At that time, data on which to base a similar table and diagram relative to typhoid fever and measles were not at hand. Here, however, the study relative to diphtheria and scarlet fever is continued from 1890 up to the close of 1894, and typhoid fever and measles are included in this study.

Table 2 and accompanying diagram (Plate 829)* forcibly illustrate the difference in results where restrictive measures were adopted, and where they were neglected, in the management of outbreaks of some of the most dangerous communicable diseases in Michigan during the five years 1890–1894.

For the five years, 1890–94, in those outbreaks in which isolation and disinfection were neglected, the average numbers of cases and deaths per outbreak are many times greater than in outbreaks in which those measures were enforced. The relations are as follows: In diphtheria, about 6 to 1, both in cases and in deaths; in scarlet fever, about 6 to 1, both in cases and in deaths; in typhoid fever, about 4 to 1 in cases, and over 3 to 1 in deaths; in measles, about 30 to 1 in cases, in deaths, none were reported as having occurred where isolation and disinfection were enforced so the relation cannot be expressed.

* Plate 829 is printed on page 155.

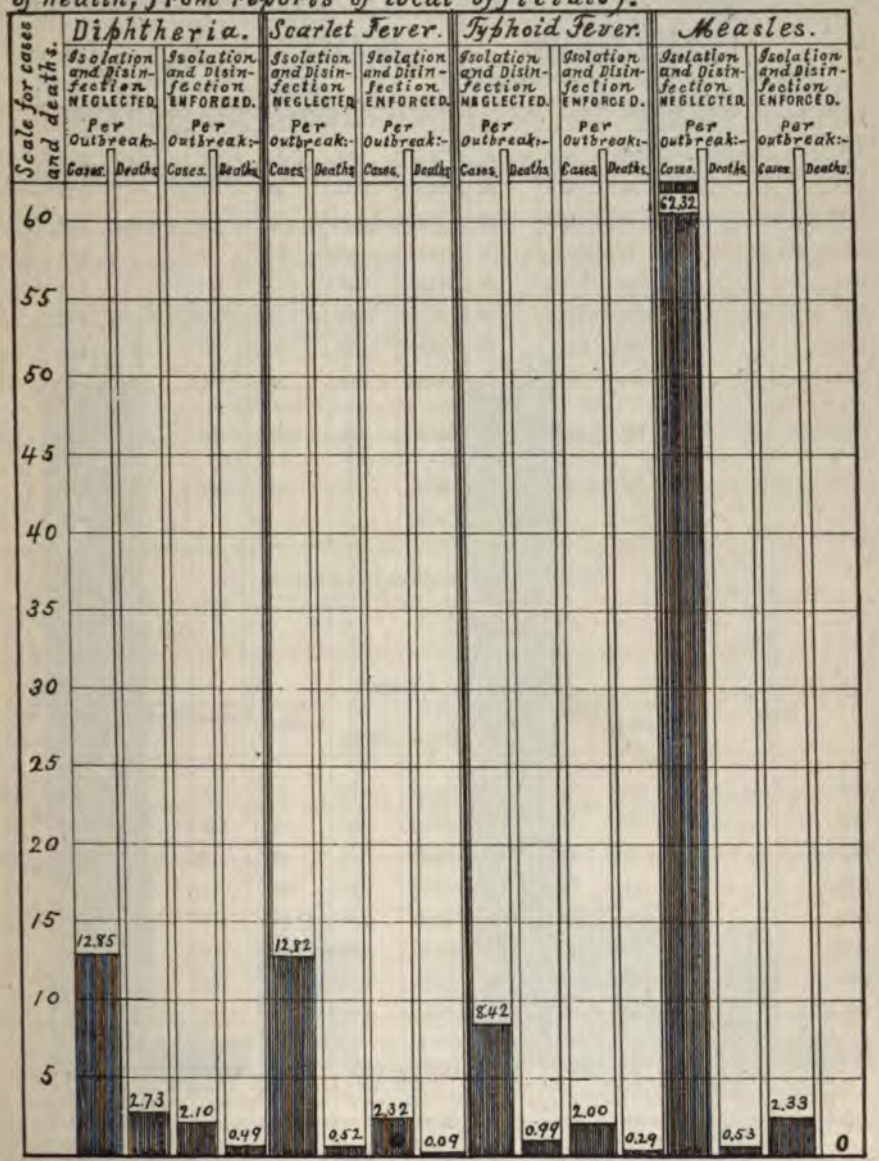
TABLE 2.—*Exhibiting, in regard to Diphtheria, Scarlet Fever, Typhoid Fever and Measles in Michigan, for the five years, and for each of the five years, 1890–1894, the Average Number of Cases and Deaths per Outbreak when Isolation and Disinfection were Enforced, and the same when those Precautionary Measures were Neglected. (Compiled in the Office of the State Board of Health.)*

Year.	Diphtheria.				Scarlet Fever.				Typhoid Fever.				Measles.			
	Isolation and Disinfection Neglected.		Isolation and Disinfection Enforced.		Isolation and Disinfection Neglected.		Isolation and Disinfection Enforced.		Isolation and Disinfection Neglected.		Isolation and Disinfection Enforced.*		Isolation and Disinfection Neglected.		Isolation and Disinfection Enforced.	
	Cases.	Deaths	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
1890	13.70	2.38	1.52	0.33	12.10	0.38	1.81	0.02	6.58	0.96	1.97	0.32	84.54	0.77	3.16	0.00
1891	11.95	2.46	2.24	0.49	13.09	0.47	2.55	0.02	21.26	2.04	1.74	0.29	83.38	0.89	2.45	0.00
1892	12.63	2.83	2.14	0.49	14.74	0.54	3.07	0.17	4.46	0.93	1.56	0.26	68.00	0.71	1.14	0.00
1893	13.78	3.81	2.45	0.69	13.19	0.80	2.62	0.13	5.10	0.50	1.60	0.24	38.30	0.20	2.40	0.00
1894	13.18	2.18	2.18	0.46	13.00	0.40	2.58	0.13	4.62	0.52	2.81	0.32	42.44	0.10	2.50	0.00
Av. for five years, 1890–94	12.85	2.73	2.10	0.49	12.82	0.52	2 32	0.09	8.42	0.99	2.00	0.29	62.33	0.53	2.33	0.00

* Includes disinfection of the discharges from the bowels.

Table 2 is graphically represented in the diagram, Plate 829, opposite this page.

Scarlet Fever, Diphtheria, Measles and Typhoid Fever in Michigan, five years, 1890-1894:- Exhibiting for each disease, for the five years, the average numbers of cases and deaths per outbreak: in all outbreaks in which both isolation and disinfection were neglected; and in all outbreaks in which those restrictive measures were enforced. (Compiled in the office of the Secretary of the State Board of Health, from reports of local officials).



[PLATE 829]

TABLE 3.—*Exhibiting for scarlet fever and diphtheria, for the period of 8 years, 1887-94, the outbreaks, cases, deaths, together with the average number of cases and the average number of deaths per outbreak, where isolation and disinfection were neglected and where they were enforced. (Compiled from reports to the Secretary of the State Board of Health.)*

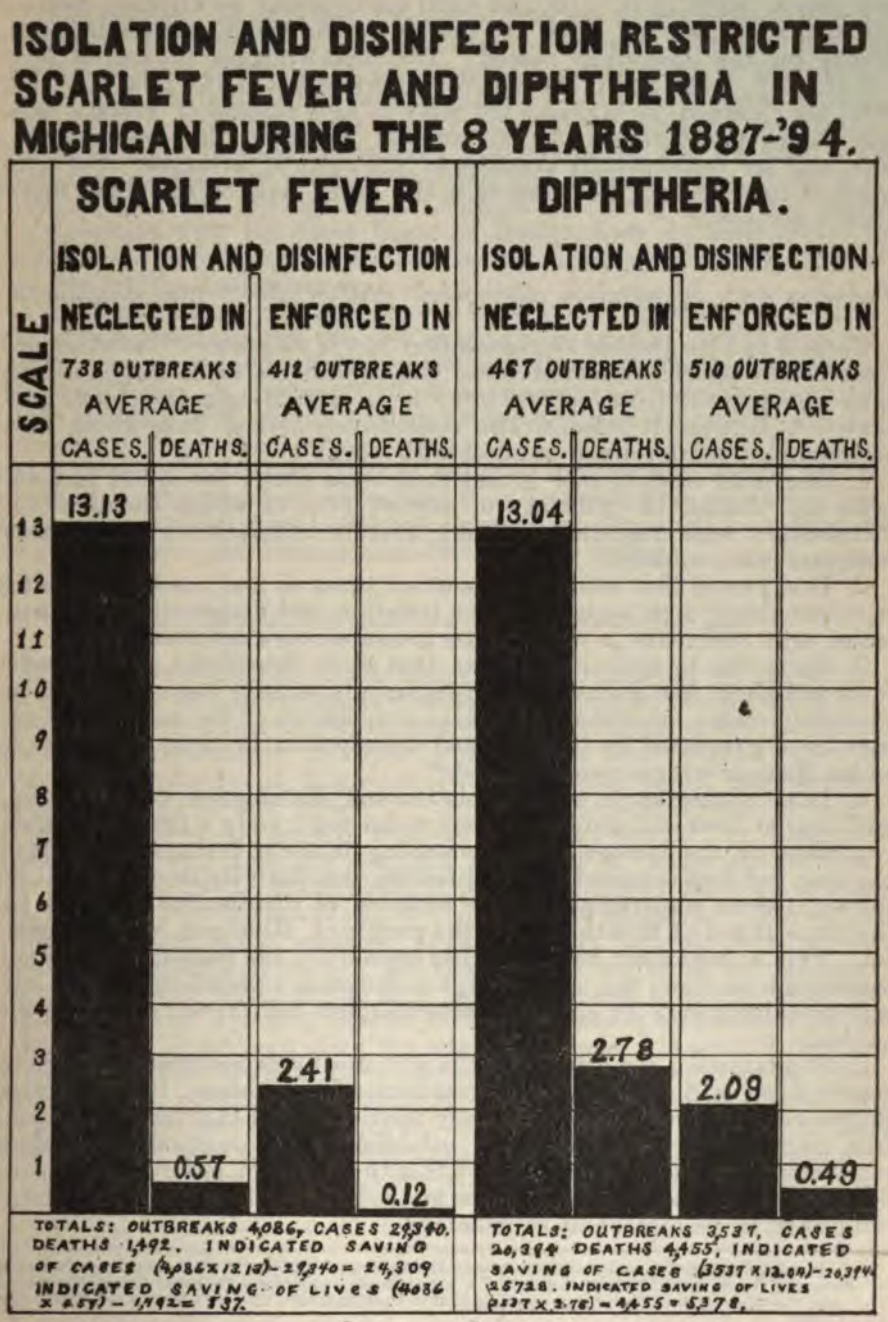
Scarlet Fever.—Isolation and Disinfection.

Year.	Neglected.					Enforced.				
	Out-breaks.	Cases.	Deaths.	Averages.		Out-breaks.	Cases.	Deaths.	Averages.	
				Cases.	Deaths.				Cases.	Deaths.
1887	32	440	34	13.75	1.06	64	148	11	2.31	0.17
1888	61	724	33	11.87	0.54	36	80	3	2.22	0.08
1889	72	1,208	48	16.78	0.67	52	140	10	2.69	0.19
1890	94	1,137	36	12.10	0.38	42	76	1	1.81	0.02
1891	141	1,704	66	12.09	0.47	42	107	1	2.55	0.02
1892	110	1,621	59	14.74	0.54	42	97	7	2.07	0.17
1893	124	1,511	99	12.19	0.80	60	157	8	2.62	0.13
1894	104	1,348	42	13.00	0.40	74	187	9	2.53	0.12
Totals	738	9,693	417	106.52	4.86	412	992	50	18.80	0.90
Averages	92	1,212	52	13.32	.61	52	124	6	2.35	.11
				13.13	.57				2.41	.13

Diphtheria.—Isolation and Disinfection.

Year.	Neglected.					Enforced.				
	Out-breaks.	Cases.	Deaths.	Averages.		Out-breaks.	Cases.	Deaths.	Averages.	
				Cases.	Deaths.				Cases.	Deaths.
1887	60	822	195	13.70	3.25	78	198	51	2.54	0.65
1888	34	527	81	15.50	2.38	58	101	31	1.74	0.53
1889	41	478	108	11.66	2.63	63	98	14	1.56	0.22
1890	71	902	169	12.70	2.38	46	70	15	1.52	0.33
1891	79	944	194	11.95	2.46	70	157	33	2.24	0.47
1892	52	657	147	12.63	2.83	49	105	24	2.14	0.49
1893	74	1,020	282	13.78	3.81	65	159	45	2.45	0.69
1894	56	738	122	13.18	2.18	81	176	37	2.17	0.46
Totals	467	6,088	1,298	105.10	21.92	510	1,064	250	16.36	3.84
Averages	58	761	162	13.14	2.74	64	133	31	2.05	0.48
				13.04	2.78				2.09	0.49

The foregoing table (3) is graphically represented in the diagram on this page.



[PLATE 815]

In Table 3 the average numbers of cases and deaths per outbreak, stated in the lower line, for scarlet fever (13.13, 0.57, 2.41, and 0.12) and for diphtheria (13.04, 2.78, 2.09, and 0.49) are obtained by dividing each of the totals representing cases and deaths by the totals representing outbreaks for the conditions named. The other averages for scarlet fever (13.32, 0.61, 2.35, and 0.11) and for diphtheria (13.14, 2.74, 2.05, and 0.48) are obtained by dividing the total in each column of average cases and deaths per outbreak by the number of years; the averages thus obtained are consequently averages of the sums of averages. For purposes of computation the averages in the lower lines of the above tables should be used.

Isolation and Disinfection Restricted Scarlet Fever and Diphtheria.

Table 3 and its graphic representation in the diagram—"Isolation and disinfection restricted scarlet fever and diphtheria in Michigan during the eight years 1887-94". (Plate 815.) is an exceedingly important presentation, because it demonstrates conclusively several facts which have an important bearing upon public-health work:—

1. The most obvious fact is that there were about five times as many cases and deaths in outbreaks of scarlet fever in which isolation and disinfection were neglected as there were in outbreaks in which those measures were enforced.

2. It is proved that there were about six times as many cases and deaths in outbreaks of diphtheria in which isolation and disinfection were neglected as in outbreaks in which those measures were enforced.

3. From the foregoing it follows that about four-fifths of the scarlet fever and about five-sixths of the diphtheria must have been derived from preceding cases; otherwise those large porportions of the cases would not have been prevented by isolation and disinfection in those outbreaks in which those measures were enforced.*

4. In all outbreaks in which isolation and disinfection were enforced, both scarlet fever and diphtheria were restricted to only a little more than two cases, on the average, notwithstanding in some instances more than one case had first occurred; it is therefore conclusively demonstrated by the eight years' experience that the methods of disinfection adopted by the State Board of Health and by the people of Michigan, were successful. This is important, because it has been quite the fashion for amateur sanitarians to decry the use of sulphur fumes as a disinfectant, and laboratory experiments by eminent bacteriologists had thrown doubt on the subject.

5. Summarizing the evidence, it is statistically demonstrated that both scarlet fever and diphtheria are communicable diseases, that wherever they occur they may be almost wholly restricted, and that until more perfect methods of disinfection are established, the methods heretofore recommended by the State Board of Health should be enforced with confidence, as the experience with those methods throughout the State shows the results to be reasonably satisfactory.

* In articles following this, on the subjects of scarlet fever and diphtheria, tables and maps trace the movements of the contagia of these diseases, and prove much relative to the other fifth of the scarlet fever, and the other sixth of diphtheria, showing that in those instances also the diseases came from preceding cases.

Cases of Sickness Prevented, Lives Saved, and Money Values Saved.

Table 4 shows, for the same diseases and for the same series of years as in Table 2, the estimated numbers of cases of sickness prevented and the numbers of lives saved by the adoption and enforcement of the restrictive and preventive measures recommended by the State Board of Health.

At a very low estimate,* the money value, to the State, of the 112,843 cases of sickness there shown to have been prevented, and the 5,261 lives saved during these five years, from these four diseases alone, amounts to $5,097,800; so that the local health officials and the people of the State, in coöperation with the State Board of Health, have by their efforts to restrict these four diseases, effected a saving to the people of the State of over one million dollars per year.

A million dollars a year saved to the people of our State by the restriction of four communicable diseases seems a large amount; but it does not, probably, represent more than half the actual saving effected by isolation and disinfection in outbreaks of those diseases. It indicates, at the values adopted, only the value of lives saved and sickness prevented *after outbreaks of those diseases have commenced.* It is reasonable to assume that by restricting the numbers of cases of sickness and deaths in outbreaks of communicable diseases, and thus decreasing the number of foci whence they spread, there is effected a proportionate reduction in the number of *outbreaks*, and a consequent further large saving.

Much Remains to be Done for the Saving of Life

Although, as evidenced above, much has been done in the prevention and restriction of communicable diseases in this State; much that is *possible* in that direction, is still to be desired. This statement is demonstrable by results shown in Table 2 (summarized from Table 4), derived from the compilation of data relative to 9,774 outbreaks of the four diseases mentioned in said table. In these 9,774 outbreaks there occurred an aggregate of 91,003 cases of sickness and 6,813 deaths. In those outbreaks which were carefully managed according to the restrictive measures prescribed by the State Board of Health, there occurred an average of 2.19 cases of sickness and .22 of one death per outbreak. Had all the 9,774 outbreaks which occurred been similarly treated, with similar results, the numbers of cases of sickness and deaths, which were respectively 91,003 and 6,813, would have been restricted to 21,405 cases and 2,150 deaths, and a saving effected of 69,598 cases of sickness and 4,663 lives; or over 76 per cent of all the cases of sickness and over 68 per cent of all the deaths shown to have occurred in the 9,774 outbreaks. It is plain that the methods recommended by the State Board of Health are not yet enforced in every part of the State. It is well known that they have never yet been fully adopted in the city of Detroit in any year, and in other parts of the State they are adopted and enforced in some years and not in others.

*The basis on which this estimate is made is as follows: For medical attendance and other necessary expenses in each case of sickness, $20; for each funeral pervented, $40, value of each life saved, for excess of earnings over expenditures, $500. Before the late war a slave was worth about $800, and now the courts usually count an average person's life worth about $5,000.

TABLE 4.—*Exhibiting for Diphtheria, Scarlet Fever, Typhoid Fever and Measles, for the five years and each of the five years, 1890–94, the numbers of outbreaks, cases and deaths and the average numbers of cases and deaths, in all reported outbreaks of those diseases; also the numbers of outbreaks, cases and deaths in outbreaks where Isolation and Disinfection were neglected and where those measures were enforced; and the indicated saving of cases of sickness and lives by Isolation and Disinfection. (Compiled in the Office of the Secretary of the State Board of Health from reports of local officials.)*

DIPHTHERIA.

Year.	All Outbreaks.					Isolation and Disinfection both Neglected.					Isolation and Disinfection both Enforced.					Indicated Saving of Cases and Lives by Isolation and Disinfection.	
	Outbreaks.	Cases.	Deaths.	Average per outbreak.		Outbreaks.	Cases.	Deaths.	Average per outbreak.		Outbreaks.	Cases.	Deaths.	Average per outbreak.			
				Cases.	Deaths.				Cases.	Deaths.				Cases.	Deaths.	Cases.	Lives.
1890	439	2,713	619	6.18	1.41	71	902	169	12.70	2.38	46	70	15	1.52	0.33	2,862	426
1891	532	2,965	643	5.57	1.21	79	944	194	11.95	2.46	70	157	33	2.24	0.49	3,392	666
1892	525	3,485	740	6.64	1.41	52	657	147	12.63	2.83	49	105	24	2.14	0.49	3,146	746
1893	536	3,133	746	5.85	1.39	74	1,020	282	13.78	3.81	65	159	45	2.45	0.69	4,253	1,296
1894	420	2,262	404	5.39	.96	56	738	122	13.18	2.18	81	176	37	2.18	0.46	3,274	512
Totals	2,452	14,558	3,152	29.63	6 38	388	4,435	966	64.24	13.66	311	667	154	10.52	2.46	16,927	3,646
Averages	490	2,912	630	5.93	1.28	78	887	193	12.85	2.73	62	133	31	2.10	0.49	3,385	729

SCARLET FEVER.

1890	477	3,054	115	6.40	0.24	94	1,137	36	12.10	0.38	42	76	1	1.81	0.02	2,715	66
1891	602	4,936	193	8.20	0.32	141	1,704	66	12.09	0.47	42	107	1	2.55	0.02	2,342	90
1892	622	5,240	306	8.42	0.49	110	1,621	59	14.74	0.54	42	97	7	2.07	0.17	3,923	30
1893	667	5,219	327	7.82	0.49	124	1,511	99	12.19	0.80	60	157	8	2.62	0.13	2,912	207
1894	662	4,349	175	6.57	0.26	104	1,348	42	13.00	0.40	74	187	9	2.53	0.12	4,257	90
Totals	3,030	22,798	1,116	37.41	1.80	573	7,321	302	64.12	2.59	260	624	26	11.58	0.46	16,154	483
Averages	606	4,560	223	7.48	.36	115	1,464	60	12.82	.52	52	125	5	2.32	.09	3,231	97

TYPHOID FEVER.

1890	330	1,924	304	5.83	0.92	53	349	51	6.58	0.96	38	75	12	1.97	0.32	247	13
1891	541	4,018	607	7.43	1.12	56	1,196	114	21.86	2.04	31	54	9	1.74	0.29	7,538	497
1892	524	2,195	416	4.19	0.79	41	183	38	4.46	0.93	35	65	9	1.86	0 26	142	71
1893	539	2,255	405	4.10	0.75	47	240	25	5.10	0.50	33	54	8	1.60	0.24	494	*0
1894	596	2,537	405	4.26	0.68	61	282	32	4.62	0.52	47	132	15	2.81	0.32	217	*0
Totals	2,530	12,929	2,137	25.81	4.26	258	2,250	260	42.12	4.95	184	380	53	9.98	1.43	8,638	581
Averages	506	2,586	427	5.16	0.85	52	450	52	8.42	0.99	37	76	1.1	2.00	.29	1,728	116

MEASLES.

1890	419	11,189	103	26.70	0.25	57	4,819	44	84.54	0.77	6	19	0	3.16	0	24,233	220
1891	392	12,338	118	31.47	0.03	71	5,920	63	83.38	0 89	11	27	0	2.45	0	20,347	231
1892	236	4,406	67	18.67	0.28	31	1,953	22	63.00	0 71	7	8	0	1.14	0	10,462	101
1893	357	5,440	71	15.21	0.19	70	2,681	14	38.30	0.20	10	24	0	2.40	0	8,233	*0
1894	358	7,345	49	20.52	0.14	70	2,971	7	42.44	0.10	13	32	0	2.50	0	7,849	*0
Totals	1,762	40,718	408	112.57	0.89	299	18,344	150	311.66	2.67	47	110	0	11.65	0	71,124	552
Averages	352	8,144	82	22.51	0.18	60	3,669	30	62.33	.53	9	22	0	2.33	0	14,225	110

TOTALS OF THE FOUR DISEASES.

Totals for 5 yrs., 1890-94	9,774	91,003	6,913			1,518	32,350	1,678			802	1,781	233			112,843	5,262

* By the last column in Table 4 it may be seen that there is no apparent saving of lives from typhoid fever and measles in the years 1893 and 1894. This showing is due to the fact that health officers failed, in a great many instances, to state whether or not restrictive measures were adopted in outbreaks of these diseases; or, made doubtful statements relative thereto. In compiling data relative to outbreaks of communicable diseases the absence of positive statements relative to them, necessitates the placing of them in the doubtful class; and, relative to typhoid fever and measles, the number of outbreaks in that class is consequently increased to a very large percentage of the whole number of outbreaks which occurred. It is probable that if full information could be obtained relative to every outbreak in the doubtful class, many of them would be found to have been neglected, the neglected class thereby greatly increased, and a saving of lives shown.

Another fact which may have a bearing on this subject is, that the sickness and deaths from typhoid fever and measles, which occurred in Detroit and Grand Rapids, where these diseases prevail more or less nearly all the time, and where no doubt many outbreaks are neglected, are (for reasons explained in the articles on typhoid fever and measles further on in this Report) not included in the Tables 2 and 4. The same is true of Ironwood in 1893, where typhoid fever was extensively epidemic during the year and from it a large number of cases of sickness and deaths occurred.

Until more perfect reports relative to outbreaks of typhoid fever and measles are obtainable, it will not be possible, in this manner, by itself, to determine with any great degree of accuracy the effects of applied isolation and disinfection in the prevention of sickness and deaths from those diseases.

Lives Saved by Public-Health Work not all Shown by Contagious-Disease Statistics.

In the preceding pages of this article, the saving of life by isolation and disinfection has been considered so far only as relates to outbreaks reported to the Secretary of the State Board of Health. It is well known that not all outbreaks are yet reported, especially not those promptly restricted to the first case. Again, the subject has been considered so far only as the statistical data is sufficient for the purpose of that study—therefore no account could be taken of such large places as contained, all of the time, cases of the diseases studied, so that the beginning and ending of an "outbreak" could not be determined. This has the effect of throwing out of the computation instances of neglect where the number of cases and deaths are very large. Again, such a disease as small-pox which in late years has not been permitted to be so dealt with that isolation and disinfection could be considered as "neglected" in any locality or, at least, only in one or two localities,—such a disease cannot well be studied in the manner yet employed for scarlet fever and diphtheria to ascertain the difference in results in outbreaks in which isolation and disinfection were "neglected" and in those in which those measures were "enforced."

For the three reasons stated above, the total saving of life in Michigan can hardly be told from the preceding study alone, except allowance be made for the deficiencies just mentioned, all of which tend to make the apparent saving less than the probable truth.

TABLE 5.—*Exhibiting the average population, the numbers of deaths, and the death-rates in Michigan from scarlet fever and from small-pox for the five years, 1869-73, before the State Board of Health was established, and from typhoid fever for the 10 years, 1869-78, before its restriction was undertaken by the State Board of Health (compiled from State Department's "Vital Statistics" of Michigan.)*

Year.	Population of the State.	Scarlet Fever. Deaths.†	Small-pox. Deaths.†	Typhoid Fever. Deaths.†
1869	Average population for the five-year period, 1869-1873, 1,215,220*	252	42	437
1870		852	10	574
1871		696	74	357
1872		565	302	621
1873		580	92	677
1874	Average population for the ten-year period, 1869-1878, 1,302,500			611
1875				433
1876				426
1877				446
1878				329
Totals		2,945	520	4,911
Averages		589	104	491
Average death rate per 10,000 inhabitants‡		4.85	.85	3.77

* Page 56, Vicksburg Sanitary Convention, December, 1889.
† Copied from page 156, Vital Statistics of Michigan, 1893.
‡ Graphically represented in Plate 825, page 165.

TABLE 6.—*Exhibiting by years the total numbers of reported deaths and the death-rate per 10,000 inhabitants in Michigan; from scarlet fever and from small-pox for the period of 21 years, 1874-94, and from typhoid fever for the period of 16 years 1879-94.*

Year.	Population.*	Scarlet Fever.		Small-pox.		Typhoid Fever.	
		Deaths.†	Deaths per 10,000 Inhabitants.	Deaths.†	Deaths per 10,000 Inhabitants.	Deaths.†	Deaths per 10,000 Inhabitants.
1874	1,334,031	440	3.30	18	0.13		
1875	1,384,515	423	3.06	26	0.19		
1876	1,435,000	399	2.78	76	0.53		
1877	1,485,484	404	2.72	102	0.68		
1878	1,535,968	429	2.80	6	0.04		
1879	1,586,453	418	2.64	6	0.04	397	2.50
1880	1,636,937	371	2.27	3	0.02	513	3.13
1881	1,691,117	384	2.27	82	0.49	884	5.23
1882	1,745,298	502	3.39	101	0.58	463	2.65
1883	1,799,478	673	3.74	5	0.03	439	2.44
1884	1,853,658	326	1.75	3	0.02	514	2.77
1885	1,893,697	255	1.39	3	0.02	387	2.04
1886	1,933,735	319	1.65	6	0.03	498	2.57
1887	1,973,774	318	1.61	0	0.00	770	3.90
1888	2,013,812	323	1.60	3	0.01	638	3.17
1889	2,053,851	240	1.17	3	0.01	637	3.10
1890	2,093,889	222	1.06	6	0.03	465	2.22
1891	2,130,827	400	1.87	1	0.00	684	3.21
1892	2,167,765	442	2.04	1	0.00	626	2.89
1893	2,204,703	360	1.63	3	0.01	689	3.13
1894	2,241,641	163	0.73	85	0.38	536	2.39
Totals 21 years, 1874-94	38,195,633	7,891	45.87	539	3.24		
Averages 21 years, 1874-1894	1,818,840	376	{ 2.16 } { 2.07 }	26	{ .15 } { ‡.14 }		
Totals 16 years, 1879-94	31,020,635					9,140	47.34
Averages 16 years, 1879-1894	1,938,790					571	{ 2.96 } { 2.95 }

The lowest set of figures in the last line of this table is graphically represented in diagram "Plate 825," on page 165.

* From page 15, Vital Statistics, Michigan, 1894.

† From page 156, Vital Statistics, Michigan, 1893.

‡ The year 1887 is included in this computation, while in the computation from which the diagram "Plate 825" was made, that year should have been but was not included, no deaths from small-pox having occurred in Michigan, in 1887.

NOTE.—The average death-rates per 10,000 inhabitants in the lower lines of the above table, "2.07, .14 and 2.95," are obtained by dividing each of the several totals representing deaths by the total population for the period involved. (The averages in the line above—"2.16, 0.15 and 2.96," are obtained by dividing the total of each column of deaths per 10,000 inhabitants by the number of years represented in that column, and are therefore, averages of the sums of averages.)

Mortality Statistics Relative to Lives Saved by Public-health Work.

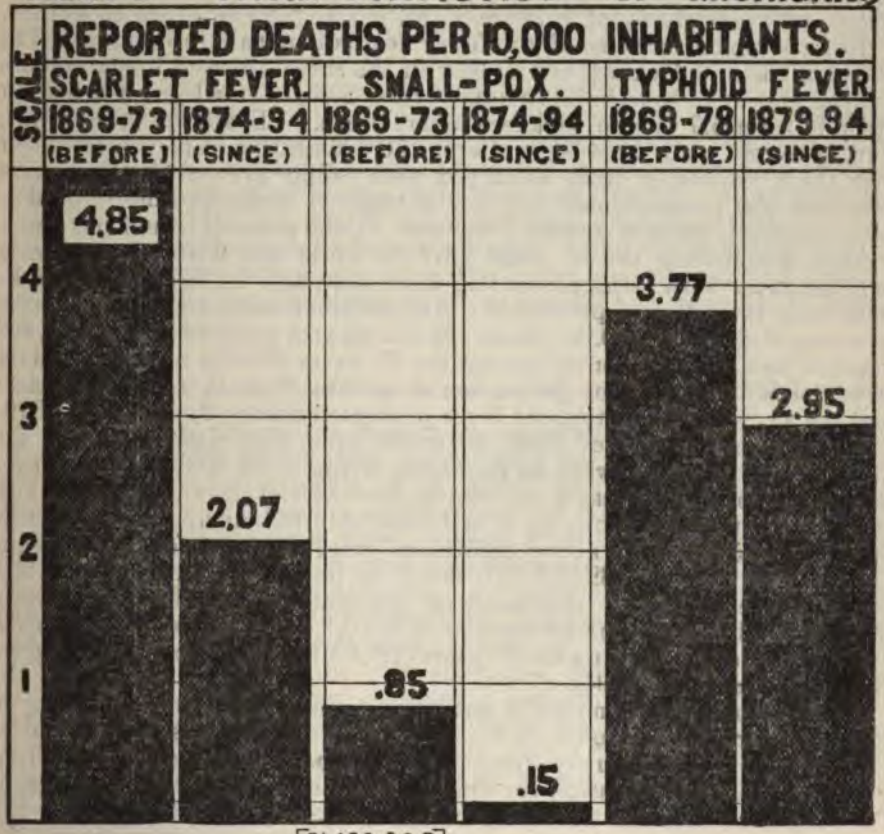
There is another method of study whereby the subject may be approached, and, although the statistics are as yet very far from complete, valuable evidence on this subject is available as follows: The statistics of deaths and causes of deaths in Michigan are required by law to be reported to the Secretary of State, and by his office compiled and published. This has been done since 1868. It is known that not all deaths are reported to the Secretary of State; but the method of the collection of the statistics has not been changed, and there is reason to believe that as large a proportion of the deaths have been reported in late years as in the earlier years.

TABLE 7.—*A comparison of the deaths from scarlet fever and small-pox reported to the Secretary of State as having occurred in Michigan during the five years (1869-1873) preceding the organization of the State Board of Health with the seventeen years and the twenty-one years immediately succeeding its organization. Also a comparison of the reported deaths from typhoid fever during the ten years immediately before the restriction of that disease was undertaken by the State Board of Health, with the deaths which occurred in the twelve years and the sixteen years after the restriction began.*

Disease.	Periods of Time Compared.	Estimated Average Population.	Average Deaths Reported per year.	Total Reported Deaths.	Average Reported Deaths per Year per 10,000 Inhabitants.	Decrease of Deaths per Year per 10,000 Inhabitants.	Average Decrease of Reported Deaths per year.	Lives Probably Saved, according to the Reports.
Scarlet Fever	5 years, 1869-73	1,215,220	589	2,945	4.85			
	17 years, 1874-90	* 1,732,394	384	6,526	2.24	2.61	425	7,684
	21 years, 1874-94	1,818,840	376	7,891	2.07	2.78	506	10,626
Small-pox	5 years, 1869-73	1,215,220	103	516	.85			
	17 years, 1874-90	1,731,394	27	449	.16	.69	120	2,040
	21 years, 1874-94	1,818,840	26	539	.15	.70	127	2,667
Typhoid Fever	10 years, 1869-78	* 1,325,110	491	4,912	3.77			
	12 years, 1879-90	1,828,604	550	6,605	3.01	.76	139	1,668
	16 years, 1879-94	1,938,790	571	9,140	2.95	.82	159	2,544
Scarlet Fever, Small-pox, Typhoid Fever	Long period of years, (16 and 21.)						792	15,837

* This average was obtained by the arithmetical method of estimating the population in the intercensal years, using the State and National censuses. Apparently it differs slightly from the average used, some years ago, in computing "Average Reported Deaths per 10,000 Inhabitants," shown in diagrams heretofore published and used in the sixth column of this table. The average estimated population formerly used is stated in the second column of Table 5.

LIVES SAVED BY PUBLIC-HEALTH WORK. COMPARISON OF DEATH-RATES IN MICHIGAN FROM SCARLET FEVER AND SMALL-POX BEFORE AND SINCE THE STATE BOARD OF HEALTH WAS ESTABLISHED, AND FROM TYPHOID FEVER BEFORE AND SINCE ITS RESTRICTION WAS UNDERTAKEN BY THE STATE BOARD. (COMPILED FROM THE STATE DEPARTMENT'S "VITAL STATISTICS" OF MICHIGAN.)



[PLATE 825]

Table 7 shows that during the 21 years (1874-94) which have elapsed since the organization of the State Board of Health, as compared with the five years immediately preceding the establishment of the Board, there has been an average annual decrease of 506 deaths reported from scarlet fever and of 127 deaths from small-pox, a decrease of 13,293 deaths from these two diseases during the 21 years. It also shows that during the 16 years (1879-94) since the restriction of typhoid fever was undertaken by the State Board, as compared with the ten years (1869-78) before such restriction was begun, there has been an average annual decrease of 159 deaths reported from that disease, a decrease of 2,544 deaths during the sixteen years; thus from these three diseases, within these specified periods, there has been a total decrease of 15,837 deaths in the State, apparently largely due to the efforts inaugurated and maintained by the State Board of Health, in the prevention and restriction of those diseases.

This means that 15,837 lives have been saved to the State; that 15,837 persons have continued to live who would have died had not the restriction and prevention of those diseases been undertaken; that the grief consequent on parting with 15,837 loved ones has been prevented; and that, at previously estimated values of lives and cost for medical attendance and funerals, the decrease in deaths here shown has effected a saving to the people of the State equal to ($8,868,720) nearly nine millions of dollars.

But the saving because of the fewer deaths is not all the saving. The ratios of cases of sickness and deaths in the three diseases under consideration appear to have been, in scarlet fever 19.5, in small-pox 5.3 and in typhoid fever 5.7 cases of sickness to one death.* Based on these ratios, during the 21 years 1874-94, while the 10,626 deaths from scarlet fever and the 2,667 deaths from small-pox were being prevented, there were probably also proportionate numbers of cases of sickness from those diseases (196,581 cases of scarlet fever and 11,468 cases of small-pox) prevented; and during the 16 years 1879-94, while the 2,544 deaths from typhoid fever were being prevented, there were also 11,957 cases of sickness from that disease prevented. At the previously estimated expense of a case of sickness ($20.00), these 196,581 cases of scarlet fever and 11,468 cases of small-pox prevented during the 21 years 1874-94 represent a sum of $4,160,980 saved by the prevention of sickness from those two diseases; and the 11,957 cases of typhoid fever prevented during the 16 years 1879-1894, represent a sum of $239,140 saved from that disease during the sixteen years; thus showing an aggregate saving of $4,400,120 by the prevention of the 220,006 cases of sickness from scarlet fever, small-pox and typhoid fever which probably would have occurred, during the periods in which the 15,837 lives above mentioned were being saved. This sum ($4,400,120) with the ($8,868,720) saved by the prevention of the 15,837 deaths above-mentioned represents an aggregate saving of over thirteen millions of dollars by the prevention of deaths and sickness, from scarlet fever and small-pox during the 21 years (1874–94) and of typhoid fever during the 16 years (1879–94).

In this study of the mortality statistics, the estimated annual saving of life differs from that shown in the study of the contagious-disease statistics made in the first part of this article,—the computations are made from different kinds of statistics, for different diseases, and for different periods of years. And if this study of the mortality statistics were for the

*Computed from data contained in the Annual Reports of the State Board of Health for the years 1890, p. 281; for 1891, p. 209; for 1892, p. 265; for 1893, p. 353; for 1894, p. 291; and from compilation sheets for each disease for 1894.

latest five years only, the average life saving apparent would undoubtedly be greater, because the life saving was not great in the earlier years and has been constantly increasing. Table 8, the lower line shows that, relative to the three diseases—scarlet fever, small-pox and typhoid fever—there was during the sixteen years 1879-94, an average annual saving of ($738,380) over seven hundred thousand dollars.

As pointed out further on, this amount probably needs to be increased by forty per cent, and would then be over one million dollars per year.

Remarks relative to Table 7 and the diagram "Plate 825."

In Table 7 and in this diagram* a comparison is made of death-rates in the State from scarlet fever, small-pox and typhoid fever before and after the establishment of the Board's educational work relative to those diseases. This diagram is made from the statistics compiled in the office of the Secretary of State. It shows that in the five-year period, 1869-73, before the establishment of the Board, the death-rates from scarlet fever, small-pox and typhoid fever were 4.85, .85 and 3.77 respectively per 10,000 inhabitants of the State; and that during the twenty-one years after the establishment of the Board, 1874-94, the death-rates from scarlet fever and small-pox were reduced to 2.07 and .15 per 10,000 inhabitants, or, a reduction of 57 per cent in the former disease and of 82 per cent in the latter. In typhoid fever, efforts for its restriction were not actively commenced until 1879, after which the reduction in the death-rate was 22 per cent.

The diagram "Plate 825" correctly exhibits the *proportion* by which the reported deaths at the rate previous to the organization of the State Board of Health have been reduced since the work for the restriction of these diseases has been done by the State Board of Health. More than one-half the death-rate from scarlet fever has been done away with. This is probable, because the statistics are collected under the same law and by the same officials before and since the Board was created, and there is reason to believe that the statistics are as complete in recent as in former years.

Lives saved by public-health work not all shown by mortality statistics.

But when one undertakes to learn the exact numbers of lives saved, the mortality statistics as they stand undoubtedly fall far below the true saving, and a large addition needs to be made, because not all deaths were reported, before or since the establishment of the State Board of Health. The Secretary of the State Board of Health has estimated that the deaths returned should be increased by at least forty per cent to make them equal the deaths which actually occurred. Dr. Wilbur, Chief of the Division of Vital Statistics in the State Department, estimates that they should be still more increased, perhaps by as much as sixty per cent. This correction need not be applied to the deaths from small-pox, because it is believed that all deaths from that cause are reported. Applying that correction to scarlet fever, and increasing the deaths by forty per cent, the saving of lives, instead of being 2.78 per ten thousand living per year, as shown in the diagram "Plate 825,"* (4.85–2.07=2.78) would be 3.89 per year in each ten thousand inhabitants. An analogous correction might be made relative to typhoid fever.

*The diagram is printed on page 165.

TABLE 8.—*Exhibiting a comparison of the average annual lives saved, cases of sickness prevented, and an estimated money saving to the people of Michigan by public-health work, relative to the three diseases mentioned, during the 21 years, 1874-94, and the 16 years, 1879-94.*

Diseases.	Number of cases in which one death results.	Average annual death-rate per 10,000 inhabitants for the five-year period, 1869-73.	Average annual death-rate per 10,000 inhabitants for the ten-year period, 1869-78.	Twenty-one year period, 1874-94.							Sixteen-year period, 1879-94.								
				Average annual death-rate per 10,000 inhabitants.	Average annual lives saved per 10,000 inhabitants, compared with five-year period, 1869-73.	Average annual population.*	Estimated average annual saving of lives.†	Average annual money saving at $360 per life.	Average annual number of cases of sickness prevented (Estimated by the second and eighth columns.)	Average annual money saving at $20 for medical attendance in each case.	Total average annual money saving.	Average annual death-rate per 10,000 inhabitants.	Average annual rate of life saving per 10,000 inhabitants.	Average annual population.*	Estimated average annual saving of lives.†	Average annual money saving at $360 per life.	Average annual number of cases of sickness prevented. (Estimated by the second and sixteenth columns.)	Average annual money saving at $20 for medical attendance on each case.	Total average annual money saving
Scarlet Fever	19.5	4.85		2.07	2.78	1,518,840	506	$283,360	9,361	$187,220	$470,580	1.87	2.98	1,938,700	578	$323,680	10,693	$213,860	$537,540
Small-pox	5.3	.85		.15	.70		127	71,120	546	10,920	82,040	.10	.75		145	81,200	624	12,480	93,680
Typhoid Fever	5.7		3.77									2.95	.82		159	89,040	906	18,120	107,160
Average annual money saved																			$738,380

* Average population is computed from data on page 15, Vital Statistics of Michigan, 1894.

† In scarlet fever and small-pox, the calculations are based on the difference in the average annual death-rate per 10,000 inhabitants for the period, 1869-73, before the State Board of Health was established and the average annual death-rates for the periods since. In typhoid fever the calculation is based on the average annual death-rate for the ten years, 1869-78, before the State Board of Health began the restriction of typhoid fever and the average annual death-rate for the periods since.

What the diagram is designed to show, however, is probably correctly although not completely shown, it is plain that the *reported* deaths from scarlet fever are less than half what they were before the work of the State Board of Health began, that the deaths from small-pox are less than one-fifth of what they were, and that the deaths from typhoid fever have been considerably reduced, although for the restriction of the last-mentioned disease the Board has been actively laboring for comparatively few years, and there is reason to hope that the reduction will soon be greater.

A long-continued increasing decrease in the death-rate from a communicable disease is evidence of effect of work for its restriction.

Among the diagrams prepared for the World's Fair at Chicago, was one entitled "Lives Saved by Public-Health Work" etc. [Plate No. 517.] It was similar to Plate 825 in this article.

Referring to the successful efforts of the State Board of Health, apparent in the above-mentioned diagram, the secretary of the Board said they were "certainly encouraging, because the least progress may be expected in the first years of the effort, and we may reasonably expect the results to increase hereafter."* This remark was made, having in mind more particularly typhoid fever, in the belief that continued efforts of the State Board of Health in the line of prevention and restriction of dangerous communicable diseases would be attended with a continually-increasing spread of the life saving knowledge among the people, and, consequently, a continually-increasing decrease of mortality from those diseases in the State. The results of later experience, shown in the diagram herewith presented (Plate 825) and constructed from data derived from the same source as those used in the diagram previously referred to, sustain that belief, for while it was shown that for the seventeen-year period ending with 1890 the average annual death-rate from scarlet fever decreased 2.61 per 10,000 inhabitants, the accompanying diagram representing the longer (twenty-one year) period ending with 1894, shows a decrease of 2.78 per 10,000 inhabitants, thus showing an increased average annual decrease in the latter period.

Relative to typhoid fever, comparison of data for the two periods above-mentioned (12 years, 1879-90, before, and 16 years, 1879-94, after restriction by the State Board was undertaken,) shows a continuing decrease in the death-rate from this disease; for while the annual decrease in the shorter period, 1879-90, was shown to be .76 of one death per 10,000 inhabitants, the decrease of the death-rate, per same number of inhabitants, in the longer period, 1879 94, was .82 of one death per 10,000 inhabitants.

Relative to small-pox, the additional annual decrease in the latter (longer) period is not great, only about two lives being annually saved more than in the shorter period, and when we consider that recently (except in Detroit) the rule has been that the disease has been restricted to the first household, and is not now in existence in this State except as it is occasionally brought in from without the State, it is clearly impossible to add much to the saving already accomplished, and it is of lesser importance to give time and space to the careful consideration of this disease than to diseases from which not only a great saving of lives has been accomplished, but also from which there is a prospect of still further great saving of life, as in scarlet fever, typhoid fever, diphtheria and measles.

* Proceedings Sanitary Convention at Menominee, 1894, page 34.

But, although the saving from small-pox has apparently about reached its limit, it is important to study it in the past for its bearing on the principle herein for the first time set forth, namely that—*A long-continued increasing decrease in the death-rate from a communicable disease is evidence of the effect of public-health work for its restriction.*

The foregoing proposition is based upon the fact, shown by vital statistics generally, that where there has been no interference with the natural course of a communicable disease there has been, as a rule, no long-continued decrease in the death-rate from that disease. The rule has been that there were epidemic years alternating with years of lessened prevalence, so that a diagram of the death-rate for a long series of years has had the appearance of waves succeeding each other with more or less regularity. This is shown, to a slight extent, in a few of the diagrams* in this volume representing the reported death-rate from scarlet fever, small-pox, measles, etc., since the registration of vital statistics began in Michigan, and before the effects of public-health work were noticeable.

With reference to the proposition mentioned above it becomes an interesting question whether or not there has been in Michigan any long-continued decrease in the death-rate from diseases concerning which the State Board of Health has been laboring for the restriction.

It may at once be stated that the time when the State Board of Health began its work for the restriction of diphtheria was after the disease had started on its epidemic rise, and that the disease continued on to the completion of its epidemic wave in spite of the efforts of the State Board of Health which were not at first able to gain the coöperation of the people, or even of the physicians generally throughout the State. So far as relates to that disease, therefore, there is as yet no standard in Michigan with which to compare the results of the work done for its restriction.

Relative to scarlet fever, small-pox and typhoid fever, there seem to be reasonably fair standards with which to compare the results of work for their restriction. The accompanying series of diagrams Nos. 1 to 7 inclusive supply evidence on this subject They graphically illustrate the decrease in the death-rates from scarlet fever, small-pox and typhoid fever.

Table 9 contains the data graphically shown in the diagrams 2 to 7.

TABLE 9.—*Exhibiting, by periods of years, the average annual death-rate per 10,000 inhabitants: from scarlet fever, small-pox, and typhoid fever; also, by periods of years, the rate of life saving per 10,000 inhabitants: from scarlet fever and small-pox. (The data in this table is used in the construction of diagrams 2 to 7 inclusive.)*

Diseases.	Average annual death-rate per 10,000 inhabitants, in periods of years.											Average annual rate of life saving per 10,000 inhabitants, in periods of years.					
	1869-73.	1874-90.	1874-94.	1874-79.	1880-85.	1886-90.	1891-94.	1869-78.	1879-84.	1885-90.	1891-91.	1874-90.	1874-94.	1874-79.	1880-85.	1886-90.	1891-94.
Scarlet Fever..	4.85	2.24	2.07									2.61	2.78	...	...		
Small-pox	.85			.27	.19	.02	.10							.58	.66	.83	.75
Typhoid Fever								3.77	3.11	2.84	2.90			...	...		

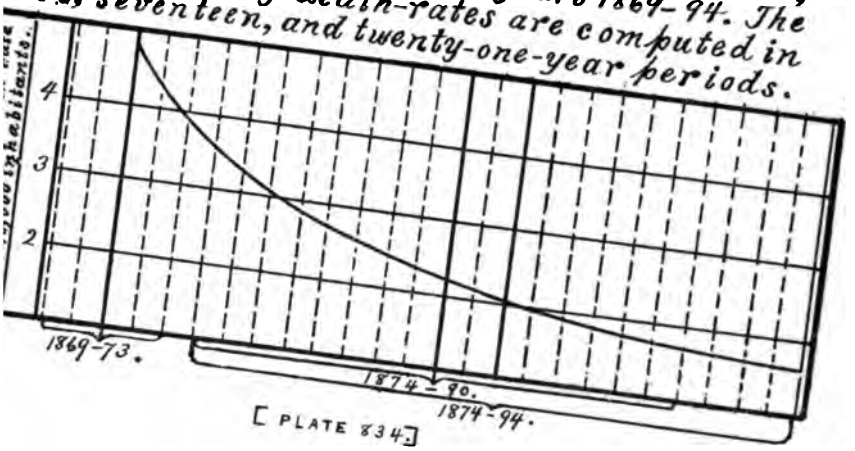
* The first diagram on page 174 illustrates the fact of epidemic waves.

Reported Deaths from Scarlet fever in Michigan, 24 Years, 1868-91.



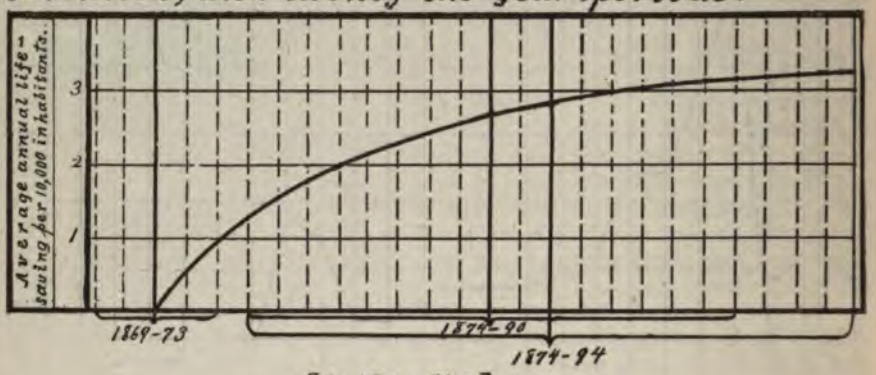
[PLATE 676.]

Diagram 2.—Exhibiting the decreasing death-rate in Michigan, per 10,000 inhabitants, from scarlet fever, for the years 1869-94. The average yearly death-rates are computed in five, seventeen, and twenty-one-year periods.



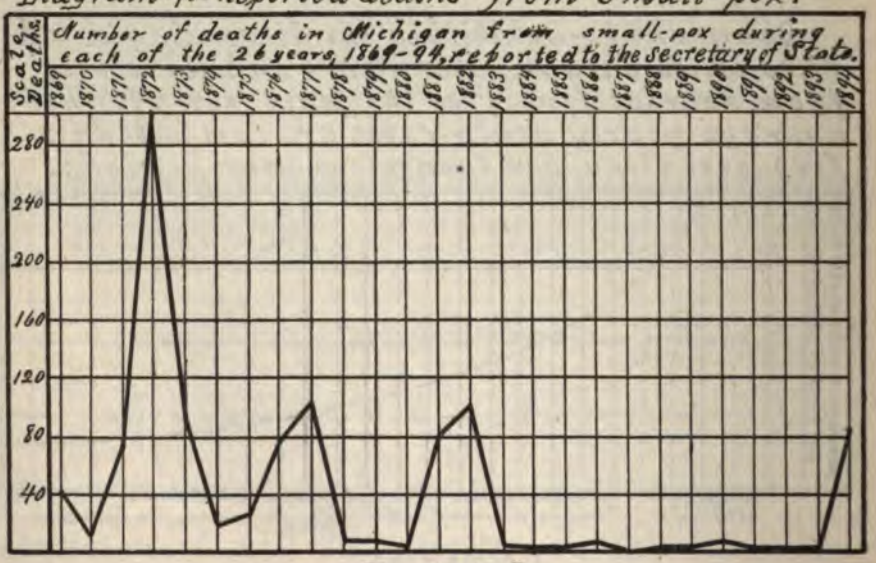
[PLATE 834.]

Diagram 3.—Exhibiting the increasing life saving in Michigan per 10,000 inhabitants from scarlet fever, for the years 1869-94. The average yearly rates of life saving are computed in five, seventeen, and twenty-one-year periods.



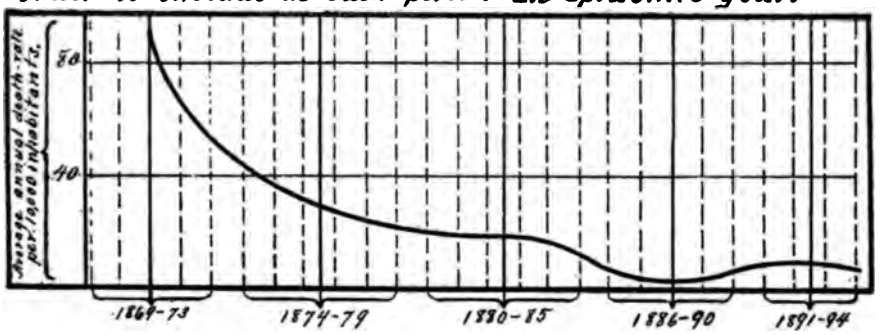
[PLATE 835.]

Diagram 4.—Reported deaths from small-pox.



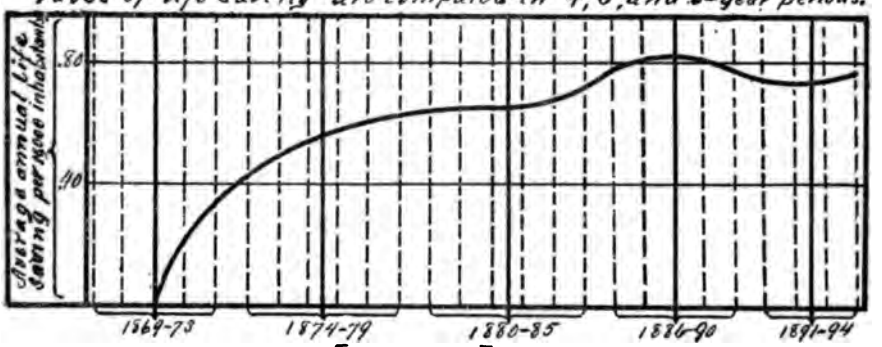
[PLATE 836.]

Diagram 5.—Exhibiting the decreasing death-rate in Michigan per 10,000 inhabitants from small-pox for the years 1869-94. The average yearly death-rates are computed in four, five, and six-year periods, in order to include in each period an epidemic year.



[PLATE 837.]

Diagram 6.— Exhibiting the increasing life saving in Michigan per 10,000 inhabitants from small-pox for the years 1869-94. The average yearly rates of life saving are computed in 4, 5, and 6-year periods.



[PLATE 838.]

Crawford, Kalkaska, Lake, Mackinac, Montmorency, Oceana, and Ogemaw counties, there were an aggregate of eleven cases of diphtheria reported, with no deaths.

The proportionate fatality or "case mortality" from diphtheria in 1894, *i. e.*, the proportion of reported cases which proved fatal, was, for the whole State, 19.31 per cent, or about one death to 5.18 cases. The maximum fatality (100 per cent) occurred in Antrim and Newaygo counties from each of which a single, fatal case was reported. Other localities where the fatality was much *greater* than the average for the State, were: Charlevoix, Gd. Traverse, Lapeer and Washtenaw, each 50; Presque Isle, 43; Emmet, 42; Van Buren, 36 per cent of reported cases. The minimum fatality (4 per cent of reported cases) occurred in Clare county. Other counties where the fatality was considerably *less* than the average for the State, were: Monroe, 4.3; Macomb, 5; Delta, 5.6; Alcona, 6; Oakland, 6.7 per cent of reported cases.

Although the sickness and death *rates* were higher for this year in Cheboygan county than in any other county of the State, the fatality in this county was only 15.13 per cent of the reported cases, or about 4 per cent less than the average for the State.

The map which follows Table 1 shows for each county of the State the sickness and death rates per 10,000 of population; the number of localities where the disease was present during the year, and the number of outbreaks which occurred in those localities. A definition of the term outbreak is printed on this page.*

Table 2 exhibits the latitudinal distribution of diphtheria throughout the State by tiers of counties; all the counties of the Upper Peninsula considered as one tier. By this table (2) it appears that the lowest sickness rate (6.81 per 10,000 of population) was in the ninth tier of counties; the two next lowest sickness-rates were in the eighth and the Upper Peninsular tiers they being respectively 7.19 and 9.15 per 10,000 of population. The tier of counties having the greatest sickness-rate (63.28 per 10,000 of population) was the eleventh—the same tier as had the greatest sickness-rate in the previous year. In the seventh tier the sickness-rate was also far above the average, being 42.69 cases per 10,000 of population.

The sickness-rate in the second tier of counties, as may be seen in the table, was 21.73 cases per 10,000 of population. In the city of Detroit, situated in this tier, the rate was 37.04 per 10,000, in the tier, excluding Detroit, the rate was 7.99 per 10,000. In the fourth tier of counties, in which is situated the city of Grand Rapids, the sickness-rate was 12.62 cases per 10,000 of population, while in the city of Grand Rapids the rate was 12 21, or slightly less than the rate for the tier, and considerably less than the average rate for the State.

* Definition of the term, "Outbreak." An outbreak is considered as the existence of one or more cases of a particular communicable disease within any health officer's jurisdiction, whether city, village, or township. All cases of the disease occurring within the jurisdiction during the outbreak are considered as part of the outbreak, unless the contagium cannot be traced to cases within the jurisdiction, and can be clearly traced to cases outside of the jurisdiction, in which instance they are considered as constituting a separate outbreak. When a period of 60 days or over has elapsed since the last case (in a given jurisdiction) died or recovered, the outbreak has been considered ended.

TABLE 1.—*Numbers of Cases and Deaths reported from Diphtheria per 10,000 persons living in each county in Michigan during the year 1894. (Compiled from reports of health officers, clerks, etc.)*

Counties.	*Population for 1894.	Number of reported		Number, per 10,000 population, of		Counties.	*Population for 1894.	Number of reported		Number, per 10,000 population, of	
		Cases.	Deaths.	Cases.	Deaths.			Cases.	Deaths.	Cases.	Deaths.
State	2,241,454	3,852	744	17.19	3.32	Keweenaw	2,804	0	0	0	0
						Lake	5,895	2	0	3.39	0
Alcona	5,411	17	1	31.42	1.85	Lapeer	28,874	2	1	.69	.35
Alger	1,384	0	0	0	0	Leelanaw	9,395	0	0	0	0
Allegan	39,185	18	3	4.59	.77	Lenawee	48,541	48	10	9.89	2.06
Alpena	17,715	67	6	37.82	3.39	Livingston	20,435	44	5	21.53	2.45
Antrim	12,427	1	1	.81	.81	Luce	2,348	0	0	0	0
Arenac	6,941	73	7	105.17	10.08	Mackinac	7,237	1	0	1.38	0
Baraga	4,232	0	0	0	0	Macomb	32,382	20	1	6.18	.31
Barry	23,699	20	4	8.44	1.68	Manistee	26,112	9	3	3.45	1.15
Bay	61,292	279	55	45.52	8.97	Manitou	917	0	0	0	0
Benzie	8,060	0	0	0	0	Marquette	38,004	10	2	26.31	.53
Berrien	45,628	25	10	5.70	2.19	Mason	18,418	75	12	40.72	6.50
Branch	26,204	69	19	26.33	7.25	Mecosta	20,730	10	2	4.82	.96
Calhoun	47,471	50	6	10.53	1.26	Menominee	23,736	45	4	18.96	1.69
Cass	21,176	8	2	3.78	.94	Midland	13,223	65	10	49.16	7.56
Charlevoix	10,931	2	1	1.83	.91	Missaukee	6,956	0	0	0	0
Cheboygan	13,896	238	36	171.27	25.90	Monroe	33,179	46	2	13.86	6.03
Chippewa	15,319	28	5	18.28	3.26	Montcalm	34,155	6	1	1.76	.29
Clare	7,975	26	1	32.60	1.25	Montmorency	2,435	3	0	12.32	0
Clinton	26,762	41	5	15.61	1.90	Muskegon	37,323	25	3	6.70	.80
Crawford	2,710	2	0	7.38	0	Newaygo	19,124	1	1	.52	.52
Delta	19,259	18	1	9.35	.52	Oakland	42,668	15	1	3.52	.23
Dickinson	14,599	33	9	22.45	6.12	Oceana	16,597	1	0	.60	0
Eaton	32,612	26	6	7.97	1.84	Ogemaw	5,636	1	0	1.77	0
Emmet	10,381	12	5	11.56	4.82	Ontonagon	6,873	0	0	0	0
Genesee	40,553	39	7	9.62	1.73	Osceola	16,475	21	3	12.75	1.82
Gladwin	4,900	0	0	0	0	Oscoda	1,804	0	0	0	0
Gogebic	14,083	7	1	4.97	.71	Otsego	4,794	24	2	50.06	4.17
G'd Traverse	17,514	8	4	4.57	2.28	Ottawa	39,075	56	18	14.33	4.61
Gratiot	28,770	18	5	6.25	1.73	Presque Isle	5,910	14	6	23.69	1.02
Hillsdale	30,271	44	7	14.54	2.31	Roscommon	1,657	0	0	0	0
Houghton	44,174	44	5	9.96	1.13	Saginaw	81,841	320	58	39.10	7.09
Huron	32,249	182	30	56.40	9.30	Sanilac	33,944	12	2	3.54	.59
Ingham	39,689	71	29	17.89	7.31	Schoolcraft	7,127	0	0	0	0
Ionia	34,817	63	18	18.09	5.14	Shiawassee	32,827	105	13	31.99	3.96
Iosco	12,339	24	2	19.45	1.62	St. Clair	54,315	57	8	10.49	1.47
Iron	5,293	3	1	5.67	1.90	St. Joseph	25,087	9	1	3.59	.40
Isabella	21,439	15	5	7.00	2.33						
Isle Royal						Tuscola	34,411	61	10	17.73	2.91
						Van Buren	31,059	14	5	4.51	1.61
Jackson	46,527	12	2	2.58	.43						
Kalamazoo	42,055	48	5	11.39	1.19	Washtenaw	43,491	8	4	1.84	.92
Kalkaska	5,637	1	0	1.77	0	Wayne	292,495	961	227	32.86	7.76
Kent	121,919	115	21	9.43	1.72	Wexford	14,047	14	4	9.97	2.85

*The population is according to the State Census of 1894.

DISTRIBUTION OF DIPHTHERIA IN MICHIGAN IN 1894.
BY COUNTIES, THE REPORTED CASES AND DEATHS PER 10,000 INHABITANTS.



[PLATE 827]

E 2.—*Exhibiting the Population of Michigan for the year 1894, by tiers of ties (Upper Peninsula as one tier); also the number of cases of Diphtheria* ERTED *from each of the divisions for 1894, and the number of cases per 10,000 ılation of each division.*

Counties in Groups, most Northern ones First.					Population, 1894.*	Reported Cases of Diphtheria, 1894.	Reported Cases per 10,000 of Population.
e					2,241,454	3,852	17.19
Penin-	Alger.	Mackinac.	Houghton.	Marquette.	206,572	189	9.15
	Delta.	Chippewa.	Ontonagon.	Iron.			
	Schoolcraft.	Isle Royal.	Gogebic.	Menominee.			
	Luce.	Keweenaw.	Baraga.	Dickinson.			
th tier nties..	Manitou.	Cheboygan.			42,035	266	63.28
	Emmet.	Presque Isle.					
	Charlevoix.						
tier of ies	Leelenaw.				46,766	95	20.31
	Antrim.	Alpena.					
	Otsego.						
	Montmorency.						
tier of ies	Benzie.	Crawford.			41,136	28	6.81
	G'd Traverse.	Oscoda.					
	Kalkaska.	Alcona.					
tier of ies	Manistee.				66,747	48	7.19
	Wexford.	Ogemaw.					
	Missaukee.	Iosco.					
	Roscommon.						
h tier nties..	Mason.	Gladwin.			154,145	658	42.69
	Lake.	Bay.					
	Osceola.	Huron.					
	Clare.	Arenac.					
tier of ies	Oceana.				91,113	92	10.10
	Newago.	Midland.					
	Mecosta.						
	Isabella.						
tier of ies	Muskegon.				250,444	442	17.65
	Montcalm.	Tuscola.					
	Gratiot.	Sanilac.					
	Saginaw.						
tier nties..	Ottawa.	Shiawassee.			378,642	478	12.62
	Kent.	Genesee.					
	Ionia.	Lapeer.					
	Clinton.	St. Clair.					
tier of ies	Allegan.	Livingston.			230,670	214	9.28
	Barry.	Oakland.					
	Eaton.	Macomb.					
	Ingham.						
tier nties..	Van Buren.				503,098	1,098	21.78
	Kalamazoo.	Washtenaw.					
	Calhoun.	Wayne.					
	Jackson.						
ier of ies	Berrien.	Hillsdale.			230,086	249	10.82
	Cass.	Lenawee.					
	St. Joseph.	Monroe.					
	Branch.						

ıment of population is taken from State Census of 1894.

DIPHTHERIA IN 1894, COMPARED WITH PREVIOUS YEARS.

ım year to year there has been a steady improvement, both in the ods adopted by the State Board of Health in securing and compiling ts, and in the efforts made by local health authorities throughout the to furnish in their reports the information desired by the State l. These facts, together with the constantly increasing population it difficult to determine the exact increase or decrease of prevalence ı disease in the State by comparison of the numbers of outbreaks of sease, and the cases and deaths resulting therefrom; and these facts d be borne in mind in referring to Table 3. While the above-men- l facts might reasonably be expected to produce a constant increase

in the reported prevalence of the disease, Table 3 shows that such increase has not occurred. In 1890 there was a marked increase in the prevalence of the disease as compared with the previous two years; but since then, notwithstanding the causes above mentioned, no considerable increase has occurred; and in 1894 there is even shown a very decided decrease in both the prevalence of the disease and the fatality therefrom. As may be seen in Table 3, not only are the numbers of outbreaks, cases and deaths in 1894 *less* than in each of the previous four years, and less than the average for the previous ten years, but the fatality is much less in 1894 than in any preceding year, and over four per cent less than the average for the ten years 1884-93.

TABLE 3.—DIPHTHERIA IN MICHIGAN.—*Numbers of Reported Outbreaks, Localities (in which they Occurred), Cases and Deaths; Average Numbers of Cases and Deaths Per Outbreak, and the Per Cent of cases which proved fatal, as reported for each of the Thirteen Years, 1882–1894; also Averages of the same for the Ten Years, 1884–93, and Comparisons of the Facts for 1894 with those for 1893 and with the Averages for the Ten Years, 1884–93.*

Year.	Reported Outbreaks.	Reported Localities.	Reported Cases.	Average Cases per Outbreak.	Reported Deaths.	Average Deaths per Outbreak.	Deaths per 100 Cases.
1882		163	2,046		495		24.
1883*		125	2,246		543		24.
1884†	362	302	3,915	10.8	905	2.5	23.
1885	467	396	4,018	8.6	964	2.0	24.
1886	550	422	4,244	7.7	982	1.8	23.
1887	466	371	3,382	7.3	825	1.8	24.4
1888	337	283	2,228	6.6	532	1.6	23.9
1889	398	329	3,157	7.9	683	1.7	21.6
1890	442	365	4,206	9.5	1,050	2.4	25.
1891	535	461	4,385	8.2	1,002	1.9	22.8
1892	527	463	4,818	9.1	1,099	2.1	22.8
1893	546	460	4,786	8.7	1,092	2.0	23.1
1894	435	367	3,852	8.9	744	1.7	19.3
Average for ten years, 1884–1893	463	385	3,909	8.4	913	2.0	23.4
Variations in 1894 from 1893	—111	—93	—884	+ .2	—348	— .3	—3.8
Variations in 1894 from the average for 10 years, 1884–93	— 28	—18	— 57	+ .5	—169	— .3	—4.1

* The use of the blank form "M" for weekly reports was begun in May, 1883.
† In compiling diphtheria the use of the annual reports of health officers was begun in 1884.

The following table (4) and diagram (No. 1) giving the number of deaths from diphtheria, per 100,000 persons living, reported to the Secretary of State, probably quite accurately represent the annual fluctuations of, but not the total deaths from diphtheria in Michigan during the 27 years, 1868-94.

BLE 4.—*Exhibiting the number of reported deaths from Diphtheria per 100,000 persons living in Michigan in each of the 27 years, 1868-94. Compiled from the Secretary of State's Vital Statistics of Michigan. (Population estimated for intercensal years, by average annual increase, by Dr. Wilbur, Chief of Vital Statistics in State Department.)*

Year.		1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.
eaths		8.84	7.80	10.22	10.49	15.06	16.44	15.60	14.68	21.36	39.51	59.36	92.55	94.20
Year.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.
eaths	122.61	81.93	56.76	58.53	56.50	58.45	47.78	35.81	41.40	60.46	49 54	46.67	43.50	28.64

Reported Deaths from Diphtheria in Michigan, 26 Years, 1868-93.

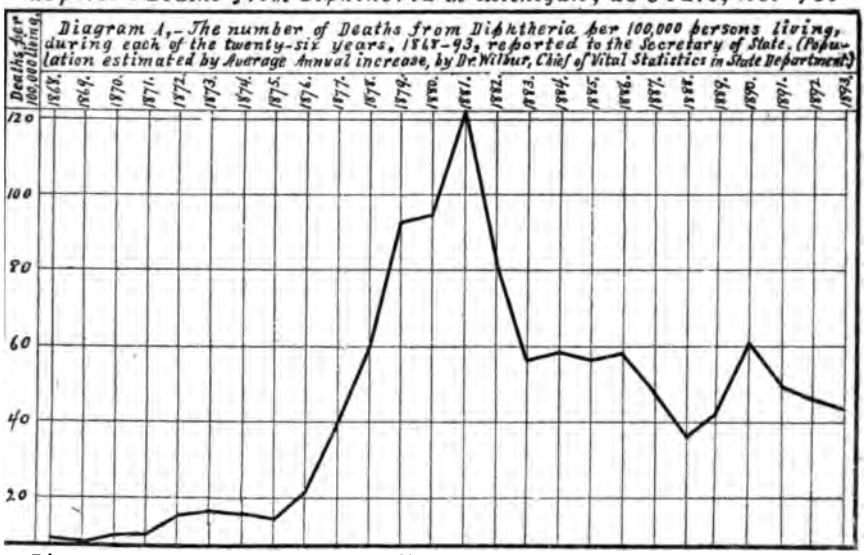


Diagram 1, graphically represents Table 4 which supplies the figures in detail.
Plate No. 768

DIPHTHERIA IN EACH MONTH OF THE YEAR, 1894.

BLE 5.—*Exhibiting the reported numbers of outbreaks of Diphtheria which Began, he numbers which Ended, and the numbers which were Present, in each Month of he Year 1894, in the different local jurisdictions of Michigan.*

Outbreaks:	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
utbreaks began	63	24	35	24	29	23	26	23	34	35	52	42	410
utbreaks ended	14	20	23	27	28	28	15	19	14	17	37	70	312
utbreaks present	67	68	80	73	75	63	59	66	77	95	124	119	

The last line of figures in table 5, representing the reported number of outbreaks present, is not derived from the preceding two lines, as might be supposed, but is obtained by actual count of the number of outbreaks reported as existing in each month. There may be a time during the outbreak when no cases are present, but if the subsequent cases can be attributed to infection from the preceding ones, it is called one outbreak. Frequently the beginning of an outbreak is reported but the end of the outbreak is not reported; and sometimes the month in which the outbreak ended is given without giving the date of the beginning of the outbreak. In either case the outbreak may have begun and ended in the same month, or it may have extended through several months. There were 98 more beginnings than endings of outbreaks reported during the year 1894.

TABLE 6.—*Exhibiting the Number and Per Cent of Cases of Diphtheria present in Michigan in each Month during the Year 1894. (Includes each case for which, the time during which it existed, was stated in the reports. Each of such cases is counted in each month in which, or part of which, the case was reported to have existed.)*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Number cases present.....	305	281	329	301	320	276	229	242	367	540	649	644
Per cent of cases present...	6.8	6 3	7.3	6.7	7.1	6.2	5.1	5.4	8.2	12.0	14.5	14.4

SOURCE OF CONTAGIUM OF DIPHTHERIA, AND HOW THE DISEASE IS SPREAD.

Of the 3,852 cases of diphtheria reported, during the year 1894, as exhibited in the following table, the local health officers reported the source of contagium as follows:—Traced to a former case, 723; traced to cases of "sore throat," etc., 30; due to infection from "clothing," etc., 48; attributed to unsanitary conditions, 154; unknown, 1,450; not reported or indefinitely reported, 1,447; total, 3,852.

TABLE 7.—*Reported Source of Contagium of Cases of Diphtheria, in 1894.*

Traced to a former case	723
Traced to cases of "sore throat," "tonsillitis," and "membranous croup"	30
Due to infection from "clothing," "old rags," etc.	48
Alleged unsanitary conditions	154
Unknown or reports not definite (includes those reported "Contagium," "Sporadic," "Spontaneous," "De Novo," etc.)	1,450
Not reported	1,447
All cases	3,852

Cases Traced to a Preceding Case.

Table 7, shows that of the 3,852 reported cases of diphtheria in the State in 1894, 723 were reported as traced to preceding cases of the disease. The following are extracts from a few of the reports in which health officers so reported:

James Eakins, M. D., health officer of Alpena city, in a final report made to this office on Nov. 3, 1894, stated relative to an outbreak of diphtheria in his jurisdiction, in which there were 11 cases and 5 deaths, that the second and third cases contracted the disease by coming in contact with the first case.

In reporting relative to an outbreak of diphtheria which occurred in Pinconning village, Bay county, the health officer, Wm. B. Abbott, M. D., stated that four of the cases could be traced to previous cases of the disease.

W. E. Robinson, M. D., health officer of Stevensville village, Berrien county, stated relative to an outbreak of diphtheria which occurred in his jurisdicton and in which there were seven cases and two deaths, that the disease was contracted in four of the cases by attending the funeral of a child that had died of diphtheria.

An outbreak of diphtheria occurred in the city of Battle Creek, which lasted from Sept., 1894, to February, 1895; in which there were 29 cases with 2 deaths. S. S. French, M. D., the health officer of the city, in his final report of the outbreak, made to this office on Feb. 18, 1895, stated as follows, relative to the source of contagium: "The first case not known. The others traced either directly or indirectly to that first one. Some 14 took it from that one, at a party."

W. F. Reed, M. D., health officer of the city of Cheboygan, in his final report of an outbreak of diphtheria which occurred in that city, and in which there were 89 cases, with 11 deaths, stated relative to the source of contagium, that 75 cases could be traced to previous cases of the disease, and some 5 or more to "Tonsillitis."

In his final report of an outbreak of diphtheria, H. Johnson, M. D., health officer of Caseville township, Huron county, stated that all of the six cases could be traced to a previous case of the disease. They were all in one household.

Milton Boies, health officer of the township of Midland, Midland county, in a final report of an outbreak of diphtheria which occurred in his jurisdiction, and in which there were 8 cases with 2 deaths, stated relative to the source of contagium, that "First case unknown; all others from contact with first case, I suppose, as they were all in close proximity."

Outbreaks Traced to Preceding Outbreaks.

The following table (8) and Map,* "Movements of Contagium of Diphtheria," show the places from and to which diphtheria was spread in Michigan, where the contagium was reported by health officers to have been introduced into their jurisdictions from localities outside the State, or from other jurisdictions within the State.

*This map (Plate 822) is printed on page 190.

TABLE 8.—*First, second and third localities, where the second locality was infected with Diphtheria from the first, and the third was infected from the second; and the numbers of cases and deaths from Diphtheria in the first, second and third localities, with the dates of the beginning and ending of each outbreak. (Compiled from reports of health officers who were able to trace the source of contagium to other localities.)*

Number.†	First Localities from which Diphtheria was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Locality.	Cases.	Deaths.	Locality.	Cases.	Deaths.	Locality.	Cases.	Deaths.
1	Alpena county: Wilson township (May 18—.)	50	1	Alpena county: Alpena city (June 21-Oct 23.)	11	5	Alpena county: Alpena township (July 1—.)	2	0
2	Alpena county	*		Alcona county: Haynes township (Nov. 21-Dec. 30.)	10	1			
3	Barry county: Middleville village (Nov. 12-Dec. 16.)	2	1	Barry county: Hope township (Nov. 22-Dec. 26.) Thornapple township (Nov. 12-Dec. 20.)	5 5	2 0	Barry county: Irving township (Nov.-Jan. 29, 1895.)	2	1
4	Bay county: West Bay City (Jan.-Dec.)	41	6	Iosco county: East Tawas village (Feb. —.)	2	1	Alcona county: Alcona township (Feb. 13-Feb. 27.)	1	0
5	Branch county: Coldwater city (Apr. 4-Apr. 29.)	2	1	Branch county: Ovid township (May 20-July 1.)	3	2			
6	Branch county: Butler township (Sept. 15-Dec. 5.)	8	1	Calhoun county: Clarendon township (Nov. 19-Nov.)	1	0			
7	Cheboygan county: Cheboygan city (Feb. 1-Jan. 5, 1895.)	110	12	Alpena county: Alpena city (Oct. 8-Jan. 17, 1895.)	4	0			
				Cheboygan county: Beaugrand township Benton township (Mar. 8-Apr. 6.)	10 5	1 2			
				Mackinac county: Cedar township (May 20-June 7.)	1	0			
8	Cheboygan county: Inverness township	1	0	Cheboygan county: Nunda township (July 4-Dec.)	58	13	Otsego county: Corwith township (July 8-Dec. 30.) Livingston township. (Nov. 20-Dec. 5.)	6 1	0 0
9	Clinton county: Bath township (Feb. —.)	2	0	Clinton county: Olive township	7	1	Clinton county: St. Johns village (June 19-Dec. 27.)	9	2
				Shiawassee county: Laingsburg village (Feb.-Dec.)	72	9	Clinton county: Victor township (June 2-Dec. 30.)	9	0
10	Emmet county: Petoskey village (Jan. 1-May 23.)	10	4	Charlevoix county: Resort township	1	1			
11	Grand Traverse county: Fife Lake village (Aug. 14-Aug. 22.)	1	0	Wexford county: Cadillac city (Oct. 15-Nov. 27.)	6	1			

* Diphtheria was not reported to this Office by the health officer of the "first" locality at the time it is said to have spread from there; showing that the disease, if present, was neglected, probably no health officer as the law provides.

† refer to corresponding consecutive numbers preceding the paragraph and the names of the health officers reporting the facts.

TABLE 8.—CONTINUED.—*Movement of infection.*

Number.†	First Localities from which Diphtheria was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Locality.	Cases.	Deaths.	Locality.	Cases.	Deaths.	Locality.	Cases.	Deaths.
12	Hillsdale county:	*	...	Manistee county: Marilla township ... (Sept. 12-Oct. 22.)	8	3			
13	Huron county: Bingham township ... (Aug. 1-Sept. 15.)	2	0	Tuscola county: Akron township..... (Oct. 5—.)	3	1			
14	Huron county: Oliver township..... (Sept. 22-Dec. 15.)	43	2	Huron county: Caseville township... Chandler township... Winsor township (Oct. 27-Dec.)	12 53 6	2 8 1	Huron county: Lake township.....	5	0
15	Ingham county: Lansing city (Jan. -Dec. 15.)	43	18	Ingham county: Mason city..... (Apr. 30-May 5.) Meridian township... (?-Apr. 16.)	1 7	0 4			
16	Ingham county: Williamston village... (Feb. 18-May.)	6	3	Eaton county: Bellevue township... (May 4-May 26.)	3	3			
17	Ionia county: Portland village (May 21-Nov. 18.)	23	10	Ionia county: Ionia city (Nov. 16-Nov. 29.) Orange township (June —.)	3 2	0 1			
18	Kent county: Byron township..... (Mar. 27—.)	1	0	Ionia county: Belding city..... (Apr. 18-Apr. 28.)	3	0			
19	Kent county: Grand Rapids city.... (Jan. 1-Dec. 29.)	97	17	Ottawa county: Wright township. ... (Aug. 15-Sept. 11.)	2	0			
20	Lenawee county: Rome township. (Aug. 10-Aug. 30.)	1	0	Lenawee county: Palmyra township...	4	1			
21	Livingston county: Howell village. (Jan. 23, 1894-Jan. 5, 1895.)	5	0	Livingston county: Genoa township.....	7	1			
22	Livingston county: Tyrone township (Aug. 11-Dec. 18.)	16	2	Genesee county: Fenton village (Nov. 28-Dec. 25.) Oakland county: Rose township..... (Sept. 1-Sept. 12.)	5 1	0 0			
23	Manistee county: Cleon township.....	*	...	Wexford county: Herring township (Jan. 30-Mar. 19.)	5	2			
24	Mason county: Amber township (Feb.-Apr.)	15	4	Mason county: Eden township.....	9	0			
25	Mason county: Scottville village..... (Jan. 17-July 6.)	9	2	Mason county: Custer township (May 29-June 3.)	1	0			

* Diphtheria was not reported to this Office by the health officer of the "first" locality at the time it was said to have spread from there; showing that the disease, if present, was neglected, probably not reported to the health officer as the law provides.

† These consecutive numbers refer to corresponding consecutive numbers preceding the paragraphs printed further on, which state the details and the names of the health officers reporting the facts.

TABLE 8.—CONTINUED.—*Movement of infection.*

Number.†	First Localities from which Diphtheria was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Locality.	Cases.	Deaths.	Locality.	Cases.	Deaths.	Locality.	Cases.	Deaths.
26	Mason county: Summit township.....	*		Mason county: Sheridan township.... (Apr. 16–June 26.)	9	2			
27	Mecosta county: Big Rapids city..... (July 27–Oct. 16.)	7	1	Mecosta county: Green township..... (Dec. 24–Jan. 5, 1895.)	2	1			
28	Ottawa county: Chester township..... (June 27–Sept. 28.)	4	0	Ottawa county: Wright township.....	6	2			
29	Presque Isle county: Metz township.....	*		Presque Isle county: Belknap township.... (Nov. 18–Jan. 25, 1895.)	14	6			
30	Saginaw county: Buena Vista township. (Nov. 15–Dec. 22.)	14	4	Saginaw county: Kochville township.. (Nov. –Nov. 20.)	2	1			
31	Saginaw county: Saginaw city (Jan. 1–Dec. 31.)	278	46	Saginaw county: Swan Creek township (May 4–May 14.)	1	0			
				Tittabawassee twp... (July 31–Aug.)	1	0			
32	Shiawassee county: Bancroft village..... (Nov. –Nov. 25.)	1	0	Shiawassee county: Vernon township (Nov. 15–Nov. 22.)	1	0			
33	Van Buren county: Gobleville village..... (Oct. 27–Dec. 3.)	5	1	Van Buren county: Bloomingdale twp. .. (Nov. 11—.)	6	3			
34	Washtenaw county: Ann Arbor city..... (Oct. —.)	1	1	Wayne county: Canton township.... (Oct. 28–Nov. 20.)	3	0			
				Ionia county: Otisco township..... (Jan. 3.—.)	14	2			
				Lenawee county: Adrian city (Dec. 13–Dec. 31.)	6	1			
35	Wayne county: Detroit city..... (Jan. 1–Dec. 31.)	881	209	Monroe county: Frenchtown township (July 2–July 20.)	1	0			
				Monroe city..... (Nov. 28–Dec. 22.)	7	0			
				Saginaw county: Chesaning village.... (Dec. 30–Jan. 19, 1895.)	1	0			
				St. Clair county: Emmett village..... (Oct.–Dec.)	14	0			
36	Northern part of the State			Livingston county: Brighton township... (Nov. 29–Dec. 28.)	9	2			

* Diphtheria was not reported to this Office by the health officer of the "first" locality at the time it was said to have spread from there; showing that the disease, if present, was neglected, probably not reported to the health officer as the law provides.

† These consecutive numbers refer to corresponding consecutive numbers preceding the paragraphs printed further on, which state the details and the names of the health officers reporting the facts.

TABLE 8.—CONTINUED.—*Movement of Infection* Into Michigan *from outside the State.*

Number.†	First Localities from which Diphtheria was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Locality.	Cases.	Deaths.	Locality.	Cases.	Deaths.	Locality.	Cases.	Deaths.
37	Canada	----	----	Delta county: Garden township (Dec. 8 —.)	18	1			
				Wayne county: Springwell township. (Mar. 29-May 25.)	2	0			
38	Chicago	----	----	Ottawa county: Grand Haven twp. (Sept. 27-Oct. 8.)	8	4			
				Holland city (Dec. 23 —.)	1	1			
				Spring Lake village.	4	0			
39	Illinois: Kankakee	----	----	Berrien county: New Buffalo village (Oct. 16-Oct. 23.)	1	1			
40	New York	----	----	Cass county: Marcellus village (Nov. 25-Dec. 4.)	1	1			
41	New York State	----	----	Barry county: Maple Grove twp. (May 5-June 10.)	2	0			
42	Ohio: Cincinnati	----	----	Berrien county: St. Joseph city (June 2-June 5.)	1	1			
43	Ohio: Delta	----	----	Hillsdale county: Camden township (Dec. 12-Jan. 5, 1895.)	26	1			
44	Ohio: Sylvania	----	----	Monroe county: Frenchtown township (Apr. 2-Apr. 20.)	1	0			
45	Ohio	----	----	Calhoun county: Tekonsha village (Dec. 28-Jan. 8, 1895.)	1	0			
				Isabella county: Coe township (Oct. —.)	1	1			
				Fremont township (Nov. 22-Dec. 15.)	6	1			
				Lenawee county: Adrian city (Jan. 4-Mar. 31.)	9	5	Lenawee county: Palmyra township	5	1
46	Ontario: Sarnia	----	----	St. Clair county: Grant township (Dec. 10-Dec. 22.)	6	0			

†These consecutive numbers refer to corresponding consecutive numbers preceding the paragraphs, printed further on, which state the details and the names of the health officers reporting the facts.

TABLE 8.—CONTINUED.—Probable *Movement of Infection.*

Number.†	First Localities from which Diphtheria was spread.			Second Localities infected from the First.			Third Localities infected from Second.		
	Locality.	Cases.	Deaths.	Locality.	Cases.	Deaths.	Locality.	Cases.	Deaths.
47	Alcona county: Harrisville township.. (Aug. 7-Aug. 16.)	*	----	Alcona county: Alcona township..... (Dec. 3-Dec. 27.)	2	0			
48	Bay county: Bangor township..... (Aug. 7-Aug. 16.)	2	2	Bay county: Monitor township... (Sept. 2-Sept. 28.)	1	0			
49	Bay county: Bay City..... (Jan. 3-Dec. 31.)	186	40	Tuscola county: Fremont township... (June 1-June 18.)	1	0			
50	Branch county: Butler township (Sept. 15-Dec. 5.).	8	1	Branch county: Girard township..... (Oct. -Dec. 1.)	9	1			
51	Branch county: Coldwater city..... (Apr. 4-Jan. 5, 1895.)	27	14	St. Joseph county: Mendon township ... (Nov. 3-Nov. 10.)	2	0			
				Leonidas township .. (Oct. 26-Nov. 19.)	3	1			
52	Cheboygan county: Cheboygan city..... (Feb.-Jan. 5, 1895.)	110	12	Chippewa county: Detour township..... (July 21-Aug. 8.)	12	0			
53	Clinton county: Bath township..... (Feb. — .)	2	0	Clinton county: Victor township (Apr. 10-Apr. 20.)	1	0			
54	Dickinson county: Iron Mountain city... (Jan. 13-May 3.)	21	6	Dickinson county: Norway city..... (June 3-June 18.)	2	1			
55	Emmet county: Petoskey village..... (Jan. 1-May 28.)	10	4	Emmet county: Bear Creek township. (Mar. 24- .)	1	1			
56	Huron county: Bad Ax village.....	*		Lapeer county: Metamora township.. (Apr. 29-May 3.)	1	1			
57	Ingham county: Alaiedon township....	*	...	Ingham county: Wheatfield township. (Jan. -Feb.)	2	0			
58	Ingham county: Lansing city (Jan.-Dec. 12.)	43	18	Ingham county: Wheatfield township (Nov. 4-Dec. 10.)	3	1			
59	Ingham county: Meridian township.... (Dec. 31, 1893-Apr. 16.)	7	4	Ingham county: Williamston Twp..... (Feb. 23-Mar. 5.)	1	0			
60	Isabellac ounty: Mt. Pleasant city.	*		Clare county: Redding township... (Sept. 15-Feb. 25, 1895.)	26	1			
61	Jackson county: Jackson city..... (Jan. 5-Apr. 21.)	5	0	Ingham county: Leslie village..... (Mar. 4-Mar. 25.)	4	1			
62	Lenawee county: Adrian city..... (Jan. 4-Mar. 31.)	9	5	Lenawee county: Clayton village..... (Feb. 2-Apr. 9.)	9	1			

*Diphtheria was not reported to this Office by the health officer of the "first" locality at the time it was said to have spread from there; showing that the disease, if present, was neglected, probably not reported to the health officer as the law provides.

† These consecutive numbers refer to corresponding consecutive numbers preceding the paragraphs, printed further on, which state the details and the names of the health officers reporting the facts.

TABLE 8.—CONTINUED.—**Probable *Movement of Infection*.**

Number.†	First Localities from which Diphtheria was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
63	Osceola county: Reed City village	14	2	Osceola county: Le Roy township. (May 15–June 1.)	5	0			
64	Otsego county: Gaylord village (Apr. 23–June 20.)	8	2	Otsego county: Hayes township	4	0			
65	Saginaw county: Saginaw city	278	46	Genesee county: Flint city. (Aug. 18–Nov. 7)	13	4			
				Oakland county: Birmingham village. (Apr. 3–Apr. 18.)	1	0			
66	Shiawassee county: Owosso city (Apr. 2–June 5.)	3	0	Shiawassee county: Woodhull township. (Apr. 25–May 3.)	1	0			
67	Washtenaw county: Chelsea village	*	----	Livingston county: Unadilla township. (Mar. 7–Apr. 15.)	2	0			
68	Wayne county: Detroit city. (Jan. 1–Dec. 31.)	881	209	Macomb county: Erin township (Feb. 6–Feb. 18.)	6	0			
				Wayne county: Romulus township. (Oct. 10–Oct. 11.)	1	1			
69	Wayne county: Springwell township. (Mar. 29–May 25)	2	0	Monroe county: Monroe city. (July 4–Aug. 11.)	8	1			
70	Canada	----	----	Macomb county: Erin township (Oct. 7–Oct. 22.)	2	0			
71	Ohio: Toledo	----	----	Hillsdale county: Hillsdale city (Oct. 1–Nov. 20.)	1	0			
				Monroe county: Erie township. (Jan. 28–Mar. 2.)	5	0			

* Diphtheria was not reported to this Office by the health officer of the "first" locality at the time it was said to have spread from there; showing that the disease, if present, was neglected, probably not reported to the health officer as the law provides.

† These consecutive numbers refer to corresponding consecutive numbers preceding the paragraphs printed further on, which state the details and the names of the health officers reporting the facts.

MOVEMENTS OF CONTAGIUM OF DIPHTHERIA IN 1894.



[PLATE XXX]

MOVEMENTS OF DIPHTHERIA CONTAGIUM IN MICHIGAN IN 1894.

On the accompanying map, the spread of diphtheria in Michigan, in the year 1894, as reported to this office, is shown by black lines which connect the localities; the arrow-heads indicate in each instance the direction of the movement. The source of this information is given in the list of "extracts from reports of health officers" (beginning on this page), with the name and address of each health officer who traced the source of contagium to some place outside of his jurisdiction. Tabular statements relating to these instances are in Table 8, pages 184–189. Consecutive numbers in the first column of Table 8, preceding each "First locality" from which diphtheria spread, facilitate reference to corresponding consecutive numbers preceding the paragraphs in the "extracts from reports of health officers" on this, and following pages.

The following are extracts from the reports of health officers who were able to trace the outbreaks of diphtheria in their respective jurisdictions, to outbreaks of the disease outside their jurisdictions,—with the name of the health officer, and of the jurisdiction, subjoined. These quotations concerning the spread of contagium from first to second, and even third localities, are arranged in the same order as the "First Localities" in Table 8, thus giving the source of each report. The consecutive numbers placed before these quotations refer to similar numbers in the first column of Table 8 of this article. The map on page 190 graphically exhibits these movements of diphtheria contagium in the year 1894.

1. "Came from Wilson township (Indian Reserve), Alpena county, Mich."—*Jas. Eakins, M. D., Alpena City, Alpena county.*

1. *"City of Alpena."—*Wm. Morris, health officer, Alpena township, Alpena county.*

2. "One of the patients working in Alpena county, brought the disease home."—*Jas. E. Fleming, Haynes township, Alcona county.*

3. "A Bates woman went to Middleville with her children visiting; this family all had what the doctor called quinsy. It went to the other families by their going back and forth; then it was called diphtheria."—*John Conger, Hope township, Barry county.*

3. "From Middleville village."—*Geo. W. Matteson, M. D., Thornapple township, Barry county.*

3. *"From Thornapple township."—*H. C. Peckham, M. D., Irving township, Barry county.*

4. "From West Bay City."—*D. C. Howell, M. D., East Tawas village, Iosco county.*

4. *"Was brought from East Tawas; the patient being a school teacher, it is supposed it was contracted in school."—*Wm. Flaws, health officer, Alcona township, Alcona county.*

5. "From a child coming from the city of Coldwater, while yet convalescing."—*Wallace E. Wright, Ovid township, Branch county.*

6. "It was brought from Butler township."—*Joseph E. Daniels, health officer, Clarendon township, Calhoun county.*

7. "Came from Cheboygan, Mich."—*James Eakins, M. D., Alpena City, Alpena county.*

7. "By a family from Cheboygan City, who had diphtheria."—*D. J. Nelligan, Beaugrand township, Cheboygan county.*

7. "From the clothing of the man working in the mill, who came from Cheboygan, at the time of the outbreak there."—*C. W. Logan, M. D., Cedar township, Mackinac county.*

8. "Traced to the township of Inverness."—*A. J. McKillop, M. D., Nunda township, Cheboygan county.*

8. *"The patient went to Wolverine, Cheboygan county, Mich., and came in contact with a boy who had diphtheria and afterwards died from same cause."—*A. Herrick, Corwith township, Otsego county.*

8. *"It came from a lumber camp near the Cheboygan county line where diphtheria was prevailing in and around Wolverine."—*N. L. Parmater, M. D., Livingston township, Otsego county.*

*See "Third locality" column of Table 8.

9. "Mrs. Wm. Ives nursed her son Emerson Ives, of the township of Bath, he having diphtheria, and after her return home was sick."—*E. H. Bedell, health officer, Olive township, Clinton county.*

9. *"Olive township."—*J. J. Travis, M. D., St. Johns village, Clinton county.*

9. "A nurse from Laingsburg went to Bath to nurse diphtheria patient, when she came back to Laingsburg she brought the disease."—*C. M. Freeman, M. D., Laingsburg village, Shiawassee county.*

9. *"From Laingsburg, Shiawassee county."—*Chas. E. Hollister, Victor township, Clinton county.*

10. "From Petoskey."—*Sidney S. Shepard, health officer, Resort township, Charlevoix county.*

11. "Was contracted from a family who moved from Fife Lake."—*David Ralston, M. D., Cadillac city, Wexford county.*

12. "By a family moving from Hillsdale county."—*M. S. Howes, health officer, Marilla township, Manistee county.*

13. "The married son of the father of this family came here on a visit, from a place called Ubly [Bingham township, Huron county], they had been sick about three months ago with diphtheria, and after visiting here they unpacked trunks, and shortly after, the outbreak occurred here."—*T. S. Miller, M. D., Akron township, Tuscola county.*

14. "Source of the disease, Elkton [Oliver township]."—*Henry Johnson, M. D., Caseville township, Huron county.*

14. "From the village of Elkton [Oliver township]."—*Stephen A. Mosher, health officer, Chandler township, Huron county.*

14. *"From Chandler township."—*Robert Gotts, Lake township, Huron county.*

15. "From Lansing city."—*J. O. Doying, M. D., Mason City, Ingham county.*

15. "Brought from Lansing."—*W. N. Diamond, M. D., Meridian township, Ingham county.*

16. "From Williamston [village]."—*H. D. Hull, M. D., Bellevue township, Eaton county.*

17. "The family went to Portland to visit, during the prevalence of diphtheria there, and remained there a few days. Three or four days after their return home the first child was taken sick."—*R. Logan, M. D., Ionia city, Ionia county.*

17. "From infected persons from Portland village."—*Herman Schlosser, Orange township, Ionia county.*

18. "Moved from Byron Center, Kent Co."—*A. M. Armour, M. D, Belding city, Ionia county.*

19. "Went to Grand Rapids to a circus, and was taken a few days after."—*C. E. Chappell, M. D., Wright township, Ottawa county.*

20. "It was brought from Rome Tp."—*S. O. Turbett, M. D., Palmyra township, Lenawee county.*

21. "From Howell."—*R. J. Behrens, health officer, Genoa township, Livingston county.*

22. "Brought from Tyrone township by parties that had said disease in family."—*D. A. Titus, M. D., Fenton village, Genesee county.*

22. "The family were visiting in an adjoining township [Tyrone] where they had diphtheria, and brought it here."—*Robert C. Stiff, health officer, Rose township, Oakland county.*

23. "Mrs. E. B., convalescent from diphtheria, came into the township from Cleon township, Manistee county, without being properly disinfected, and brought the disease with her."—*H. E. McNitt, health officer, Harring township, Wexford county.*

24. "From the township of Amber."—*P. E. Bailey, health officer, Eden township, Mason county.*

25. "Mrs. R. visited at Scottsville [village], Mason county, one week previous to the time the child came down."—*Austin D. Kibbe, M. D., Custer township, Mason county.*

26. "It was brought here from the township of Summit, by persons going there."—*Geo. Brisbin, health officer, Sheridan township, Mason county.*

27. "Exposed at Big Rapids."—*N. R. Bradley, M. D., Green township, Mecosta county.*

28. "From Custer township where it was prevalent."—*C. E. Chappell, M. D., Wright township, Ottawa county.*

29. "From the township of Metz where diphtheria occurred a year previously."—*Christian Klee, health officer, Belknap township, Presque Isle county.*

30. "The one that died was brought home sick from Buena Vista township, Saginaw county."—*John Gerber, health officer, Kochville township, Saginaw county.*

31. "E. G., was working in Saginaw city, caught the disease and came home."—*J. E. Crosby, health officer, Swan Creek township, Saginaw county.*

31. "From Saginaw."—*Wm. H. Metcalf, Tittabawassee township, Saginaw county.*

32. "This person was attending school at Bancroft, Mich., came home sick. Case diagnosed by her physician as diphtheria, who said that similar cases existed in Bancroft."—*Frank S. Love, M. D., Vernon township, Shiawassee county.*

*See "Third locality" column of Table 8.

33. "Exposure while in Gobleville village."—*W. A. Mumbrue, M. D., Bloomingdale township, Van Buren county.*

34. "The disease was contracted while one of the persons was at work as a domestic in the city of Ann Arbor."—*Henry F. Horner, health officer, Canton township, Wayne county.*

35. "The mother and youngest child (6 years) visited at Detroit during the holidays, at 392 Delzelle St."—*Wm. Bell, M. D., Otisco township, Ionia county.*

35. "Child visiting in Detroit, came home and in about one week came down with disease."—*Frank E. Andrews, M. D., Adrian city, Lenawee county.*

35. "Was contracted in Detroit."—*Frank Delye, health officer, Frenchtown township, Monroe county.*

35. "They were children visiting at Detroit; were staying with a family that had sore throat but had no physician attending them."—*L. C. Knapp, M. D., Monroe city, Monroe county.*

35. "The first case was brought home sick from Detroit."—*D. W. Mudge, M. D., Chesaning village, Saginaw county.*

35. "Boy came from Detroit and brought disease which manifested itself three days after return."—*A. J. Abbott, M. D., Emmett village, St. Clair county.*

36. "Brought from northern part of State."—*W. C. Brown, M. D., Brighton township, Livingston county.*

Outbreaks in Michigan Traced to Preceding Cases Outside of the State.

37. "Communicated by parties coming from Canada."—*Aristides Thebault, clerk, Garden Tp., Delta county.*

37. "First case contracted in Canada."—*Fred. J. Clippert, M. D., Springwells township, Wayne county.*

38. "Contracted while burying body dead with black diphtheria in Chicago, Ill."—*Peter C. Northouse, Grand Haven township, Ottawa county.*

38. "Imported from Chicago."—*Geo. H. Sipp, Holland city, Ottawa county.*

38. "From Chicago."—*C. P. Brown, M. D., Spring Lake village, Ottawa county.*

39. "Came from Kankakee, Illinois."—*W. C. Weed, health officer, New Buffalo village, Berrien county.*

40. "A young lady from N. Y. just visited the family who had a severe acute disease of the throat."—*Fred Shillito, M. D., Marcellus village, Cass county.*

41. "From the State of New York, by the mother of the boy so reported by the physician."—*Thos. J. Ford, health officer, Maple Grove township, Barry county.*

42. "From Cincinnati, Ohio."—*Alfred Baldrey, St. Joseph city, Berrien county.*

43. "A family living at Delta, Ohio, near Toledo, had a case of diphtheria which proved fatal. They sent their other child to its grandfather's, it took diphtheria."—*W. A. Oliver, M. D., Camden township, Hillsdale county.*

44. "Was contracted in Sylvania, Ohio."—*Frank Delye, health officer, Frenchtown township, Monroe county.*

45. "Brought in clothing from a town in Ohio."—*J. L. Ramsdell, M. D., Tekonsha village, Calhoun county.*

45. "Family moved in from Ohio; child sick when they arrived, Oct. 27."—*H. O. Barnard, health officer, Coe township, Isabella county.*

45. "The first case occurred in the family while at Shepherd, Mich. They brought it from Ohio."—*Allen Keen, M. D., Fremont township, Isabella county.*

45. "First case came from Ohio and was taken sick two days after."—*Frank E. Andrews, M. D., Adrian city, Lenawee county.*

45. "It was brought from Adrian."—*S. O. Turbett, M. D., Palmyra township,* Lenawee county.*

46. "From Sarnia, Ont."—*Geo. Todd, M. D., Grant township, St. Clair county.*

Outbreaks Probably Traced to former Outbreaks.

47. "Supposed to have been exposed to the disease at a public meeting in the township of Harrisville."—*Wm. Smith, health officer, Alcona township, Alcona county.*

48. "Probably carried by the doctor who was staying at the house, and was attending to a case of diphtheria in another township (Bangor)."—*Jno. C. Francis, clerk, Monitor township, Bay county.*

49. "I think it was carried from Bay City, by an aunt of the child, who had been visiting in Bay City in a house where two persons had died with the disease."—*B. C. Bradshaw, M. D., Fremont township, Tuscola county.*

50. "The Butler case probably."—*Jas. H. Anderson, M. D., Girard township, Branch county.*

* See "Third-locality" column in Table 8.

51. "Coldwater."—*Edwin Stewart, M. D., Mendon township, St. Joseph county.*

51. "Unknown unless contracted while driving through Coldwater where they had the epidemic."—*W. C. Hontz, M. D., Leonidas township, St. Joseph county.*

52. "Probably by parties coming here from Cheboygan."—*W. B. House, M. D., Detour township, Chippewa county.*

53. "Probably from the family of Emerson Ives of Bath township."—*Chas. E. Hollister, Victor township, Clinton county.*

54. "Probably from Iron Mountain."—*Jno. B. Brasur, M. D., Norway city, Dickinson county.*

55. "I believe that it must have been communicated to A. B.'s family from the family of his sister, Mrs. N., visiting in Petoskey, where family had the disease in Dec. and Jan."—*A. G. Oven, M. D., Bear Creek township, Emmet county.*

56. "Claimed to be from visiting with a friend at Bad Axe [Huron county]."—*F. E. Wolfe, M. D., Metamora township, Lapeer county.*

57. "Supposed to have been contracted in the adjoining township of Alaiedon."—*A. D. Pollock, health officer, Wheatfield township, Ingham county.*

58. "A lady and children visiting from city of Lansing are supposed to have brought the disease from there, as one child had been sick with sore throat."—*A. D. Pollock, health officer, Wheatfield township, Ingham county.*

59. "Probably contracted from a case in Meridian township."—*E. F. Shaw, M. D., Williamston township, Ingham county.*

60. "Said to have been brought from Mt. Pleasant."—*K. C. Couch, health officer, Redding township, Clare county.*

61. "Supposed to have been brought in clothing from Jackson, Mich."—*J. N. Green, M. D., Leslie village, Ingham county.*

62. "Supposed to have come from Adrian."—*J. McDonald, M. D., Clayton village, Lenawee county.*

63. "From Reed City village, probably."—*R. McDermott, M. D., Le Roy township, Osceola county.*

64. "I think by the family visiting at a house in the village of Gaylord, where there were two cases of diphtheria last spring."—*J. F. Vantyle, health officer, Haynes township, Otsego county.*

65. "Do not know unless from child, coming from Saginaw visiting, who had recently recovered from diphtheria."—*Noah Bates, M. D., Flint city, Genesee county.*

65. "Small boy visited Saginaw, came home and in five days came down with diphtheria."—*Jno. L. Campbell, M. D., Birmingham village, Oakland county.*

66. "Th ught to have come from Owosso. Patient visited that city."—*Geo. W. Church, M. D., Woodhull township, Shiawassee county.*

67. "From Chelsea, perhaps."—*Samuel DuBois, M. D., Unadilla township, Livingston county.*

68. "Probably contracted in the city of Detroit."—*Jas. Yates, M. D., Erin township, Macomb county.*

68. "Supposed to have been contracted in Detroit."—*E. J. Johnson, health officer, Romulus township, Wayne county.*

69. "By visitors from Delray [Springwells township], I think."—*L. C. Knapp, M. D., Monroe city, Monroe county.*

Outbreaks in Michigan Probably Traced to Preceding Cases Outside of the State.

70. "His family thought he contracted the disease from a person in Canada."—*Jas. Yates, M. D., Erin township, Macomb county.*

71. "Supposed to have come from Toledo, Ohio."—*Anson R. Brown, M. D., Hillsdale city, Hillsdale county.*

71. "Supposed to be from a midwife from Toledo."—*K. K. Harrison, Erie township, Monroe county.*

Outbreaks Traced to Cases of "Sore Throat."

The following reports of health officers show how diphtheria is frequently spread under that fear-allaying title, "sore throat":—

"I think an older sister of the patient lost a child with what was called putrid sore throat, and came here without having her clothing disinfected."—*J. L. Ramsdell, M. D., Tekonsha village, Calhoun county.*

"Supposed to have been contracted from a cat that had sore throat."—*H. O. Barnard, health officer, Deerfield township, Isabella county.*

"A young lady visiting and occupying same bed with first case, three weeks after she had sore throat of mild character, not sufficiently severe to call a physician."—*J. M. Rankin, Richland township, Kalamazoo county.*

"Probably from a common sore throat and neglect on the part of the parents, as no other cases were near."—*N. P. Stewart, health officer, Wells township, Tuscola county.*

"A young lady from New York, just visited the family, who had a sore throat, and the mother of the child had a severe inflammation of the throat."—*Fred Shillito, M. D., Marcellus village, Cass County.*

"The only source that I could trace it to was that she had taken dinner where a child had a sore throat."—*Chas. McLachlin, M. D., Seville township, Gratiot county.*

"The week before the patient was taken sick, he sat on his sister's lap and kissed her. The sister, who lives in another part of the county, had been suffering from severe sore throat, but employed no physician. Her baby was also sick with sore throat."—*F. G. Legge, M. D., Allen township, Hillsdale county.*

"From a case of supposed (or what I called) tonsillitis, is the only source that I can find."—*Chas. A. Scribner, M. D., Barry township, Barry county.*

"A lady and children visiting from city of Lansing are supposed to have brought the disease from there, as one child had been sick with sore throat."—*A. D. Pollock, health officer, Wheatfield township, Ingham county.*

"Not certain, but think they took it from a neighbor's family who all of them had a sore throat, but the physician who attended them, said that it was not diphtheria."—*Wm. Hayford, M. D., Tyrone township, Livingston county.*

"They were children visiting at Detroit; were staying with a family that had sore throat but had no physician attending them, and when home came down with disease."—*L. C. Knapp, M. D., Monroe city, Monroe county.*

An outbreak of Diphtheria in Tekonsha township, Calhoun county, started with cases of "sore throat."

An outbreak of diphtheria occurred in the township of Tekonsha, Calhoun county, which lasted from Dec. 12, 1894, to Jan. 3, 1895, and in which there were 4 cases, with one death; the health officer, Dr. J. L. Ramsdell, wrote to the Secretary of this Board relative to the beginning of the outbreak, as follows:—

"The case of diphtheria is practically in the village [Tekonsha], but just outside the corporate limit. The history of the case is this: Some three weeks ago a little boy in the family had a slight sore throat and the mother treated him with home remedies; he got better, and in a few days was back in school. In about a week's time another boy, older, had a sore throat and was treated in the same way but did not get better; a doctor was called, who said it was a case of tonsillitis. Then in a few days the present case was taken, which developed a marked case of diphtheria.

"As other children in the family had been in school I thought best to close the schools, churches and all public gatherings for ten days or two weeks, and did so.

"Do you think that the other cases were probably diphtheria? Am unable to trace its origin as yet.

"Is there any Anti-toxine procurable, or is it not advisable to experiment with it as yet?"

Dec. 18, 1894, the Secretary of this Board wrote in answer to the above quoted letter as follows:—

"Accept thanks for your letter of Dec. 17, relative to diphtheria and typhoid fever. I enclose herewith our usual circular letters relative to those diseases.

"I think the former cases of 'sore throat' in the family where the cases of diphtheria now are, were also diphtheria. They should have been reported to you, and precautions taken. I enclose herewith a set of resolutions relative to the subject of sore throats.

"I do not know of any 'Antitoxine' in Michigan now. I cannot advise you relative to *treatment* of diphtheria. Our work is restricted to the 'restriction and prevention' of it."

Outbreaks of Diphtheria Attributed to Unsanitary Conditions.

The following are some representative statements of health officers (or clerks) who attributed outbreaks of diphtheria in their jurisdictions to unsanitary conditions, with the name of the health officer and of his jurisdiction subjoined:—

"Came from bad sanitary surroundings; dead cat in cistern."—*O. F. Burroughs, M. D., Gun Plains township, Allegan county.*

"Improper hygienic surroundings. Badly drained swamp."—*E. C. Warren, M. D., Lincoln township, Arenac county.*

"Unsanitary surroundings of house."—*Frank A. Votey, M. D., Benton Harbor city, Berrien county.*

"Do not know, unless it was local unsanitary condition of house, well, privy, etc."—*Jno. D. Greenmyer, M. D., Niles city, Berrien county.*

"Bad drainage and water."—*J. B. Arnold, health officer, Fredonia township, Calhoun county.*

"A severe cold, neglected; with not the best of sanitary conditions. Filthy hog pen, terrible privy close to the house."—*C. W. Throp, health officer, Volinia township, Cass county.*

"Damp and ill ventilated cellar."—*F. W. Martin, M. D., Westphalia township, Clinton county.*

"Improper sanitary surroundings."—*H. J. Emery, M. D., Charlotte city, Eaton County.*

"Could not say, unless it could be from a filthy meat market, kept by his father, which the child is in most of the time."—*T. O. Potter, M. D., Fife Lake village, Grand Traverse county.*

"First case from local causes (unsanitary condition of residence)."—*Edward C. Varnum, health officer, Jonesville village, Hillsdale county.*

"The family lived in an old log house banked up with dirt and the surroundings were unsanitary."—*F. A. Hargrave, M. D., Ronald township, Ionia county.*

"Improper drainage."—*Jas. E. Howe, M. D., Dearborn township, Wayne county.*

"Bad drainage."—*Jas. Cahalan, M. D., Wyandotte city, Wayne county.*

Outbreaks of Diphtheria Attributed to Infection from Clothing, Old Rags, etc.

The contagium of diphtheria is frequently carried in clothing, old rags, and by means of numerous other articles such as pencils, toys, books, and by the passage of dogs and cats from one house to another. Such media for conveying the contagium were mentioned in a number of instances by the persons reporting to this Office, during the year 1894.

The following are representative statements of health officers (or clerks) who attributed outbreaks of diphtheria in their jurisdictions to infection from clothing, old rags, etc., with the name of the health officer and of his jurisdiction subjoined:—

"Believed to have been carried there by a man who came from an adjoining township, where the disease raged last year, through a bundle of old clothes which he had packed away during that outbreak."—*Jno. H. Tuggey, clerk, Wilson township, Alpena county.*

"Carried in clothing from Clarendon township."—*F. J. Brown, M. D., Butler township, Branch county.*

"From clothing bought of a rag buyer."—*Wallace E. Wright, health officer, Ovid township, Branch county.*

"Brought in clothing from a town in Ohio. I think an older sister of the patient lost a child with what was called putrid sore throat and came here without having her clothing disinfected. This child developed diphtheria in about nine days."—*J. L. Ramsdell, M. D., Tekonsha village, Calhoun county.*

"By a family moving from Cheboygan city, that had diphtheria. Their clothing had never been disinfected after their recovery."—*D. J. Nelligan, health officer, Beaugrand township, Cheboygan county.*

"After a most careful investigation it is impossible to determine the source. About nine years ago Mr. P's family had diphtheria, two children dying. It is impossible [?] that a recent resurrection of old clothes or garments from that date is responsible."—*A. G. Oven, M. D., Petoskey village, Emmet county.*

"Supposed to have been brought in clothing from Jackson, Mich."—*J. N. Green, M. D., Leslie village, Ingham county.*

"Probably by wearing new clothes that were made in a 'sweat shop.'"—*E. J. Ross, M. D., Rome township, Lenawee county.*

"From the clothes of the man working in the mill, who came from Cheboygan at the time of outbreak there. The woman, whose child was sick, did their washing."—*C. W. Logan, M. D., Cedar township, Mackinac county.*

"Think it was from cats, as they left a house where there were cases of diphtheria and went to this place two or three weeks before the present ones were taken sick."—*Oren A. Eaton, M. D., Amber township, Mason county.*

"From doll and clothing not disinfected."—*F. A. Towsley, M. D., Midland city, Midland county.*

"The most probable source was two peddlers who stopped at place two days and nights, and overhauled their load of rags. The first case being around them while so doing."—*J. S. Shoemaker, M. D., Hazleton township, Shiawassee county.*

"The disease was from infected articles."—*Henry Diem, health officer, China township, St. Clare county.*

"It seems that the married son came here on a visit from a place called Ubly, they had been sick about three months ago with diphtheria, and after visiting here they unpacked trunks and shortly after the outbreak occurred here."—*T. S. Miller, M. D., Akron township, Tuscola county.*

"Supposed to be from a quantity of old rags that had been collected about the country and stored in a barn. The children having access to those rags."—*Morton F. Case, health officer, Pittsfield township, Washtenaw county.*

Diphtheria Contagium Supposed to have been Carried by Animals.

In the final report of an outbreak of diphtheria in Amber township, Mason county, in which there were 14 cases of diphtheria with four deaths, the health officer, O. A. Eaton, M. D., stated as follows,—relative to the method by which the disease was spread: "Think it was from cats, as they left a house where there were cases of diphtheria and went to this place 2 or 3 weeks before the present ones were taken sick."

Dr. N. L. Parmater, health officer of the village of Gaylord, Mich., in the final report of an outbreak of diphtheria in his jurisdiction, stated as follows relative to the probable means by which the disease was spread: "Had four other cases in next house, and is supposed to have been communicated by the dog, or in some such way, as both families housed the dog, and children played with it."

Diphtheria Contagium Carried by Persons who did not Themselves have the Disease.

During the year 1894 reports of diphtheria made to this office, stated the source of contagium as from some distant place, and that the infection had been carried by persons who were not themselves affected. Below is given an example of such reports:

Chas. Robinson, president of the board of health of Grand Haven township, Ottawa county, sent an outbreak report to this office, Sept. 27, 1894, in which he stated, relative to the source of contagium, as follows:—

"I understand the older brother and mother went to Chicago about two weeks ago, and buried a brother and son, who had died of diphtheria, and it is supposed they brought the disease home to the children. Will make you a full report tomorrow. The family are German."

Mr. Robinson stated in this outbreak report that there were three children sick in the one family. The outbreak lasted from Sept. 27 to Oct. 8, and resulted in 8 cases with 4 deaths.

* * * * * * *

In the "Medical Age", Detroit, Mich., Sept. 25, 1894, is published a paper—"The Contagiousness of Diphtheria",—read before the Ontario Medical Association at Toronto, June, 1894, by John R. Hamilton, M. D., from which the following is quoted:—

"In Feb. 1893 I was called to attend a family in which a little boy of seven years was prostrated with this disease; afterwards one of the young women of the family was taken with it. The little boy had the asthenic form followed by paralysis, to which he afterwards succumbed; the young woman recovered. But during the time of the illness of these two, a relative—mother of a large family—visited them, remained only a day, and then returned to her home nine miles distant. Four or five days afterwards I was

called to attend two of her children, one of whom had already hemorrhage from the throat and nose, and in a few days her whole family, including the servant girl, contracted the disease. Now, there was no diphtheria in the neighborhood of the family either before or after this event, neither had the mother any symptoms of the disease." * * * "The Medical Health Officer for Toronto for 1892, in an essay read before the Provincial Board of Health, says:—

"'As an example I may state that an infant living in one of the suburbs of this city was sent away from home when the disease existed, for fear of contagium. The baby was successively sent to three families living in remote parts of the city. The baby took no sickness, but diphtheria occurred in all three houses, two of the infected children dying.'"

Diphtheria Supposed to have been Contracted from a Drinking-cup.

Dr. J. S. Shoemaker, health officer of the township of Hazleton, Shiawassee county, in the final report of an outbreak of diphtheria, stated as follows relative to the probable means by which the contagium was carried from one person to another: "Thought to be by drinking from the same cup as a convalescent from former outbreak."

HOW DIPHTHERIA IS SPREAD,—TRANSGRESSIONS OF PUBLIC-HEALTH LAWS.

Frequently reports reach this office of persons infected with the contagium of diphtheria being permitted, in violation of the health laws of the State, to go from one family to another, to go upon the public streets, or to public or social gatherings, to go from one jurisdiction to another, and to travel upon the railroads, etc. To these transgressions of the laws, we can ascribe a large percentage of the outbreaks of this disease in our State. In some instances health officers fail to thoroughly isolate patients or to disinfect their rooms and clothing, thereby allowing the germs of the disease to remain, to cause other outbreaks at some future time; others allow public funerals, or the bodies of decedents from diphtheria to be conveyed from one point to another, scattering the contagium of the disease to innocent persons.

Other lamentable facts in regard to this subject are, that the proper authorities sometimes fail to comply with the law which provides for the appointment of health officers in their jurisdictions; and that physicians and householders transgress the law by neglecting to report to their health officers, cases of communicable diseases which come to their knowledge, or occur in their houses; and that householders fail to coöperate with health officers in their efforts to restrict communicable diseases; and even resist their attempts to stamp out those diseases by the performance of duties prescribed to them by law.

The following are extracts from letters and reports received at this Office, bearing on this subject:—

Dr. J. S. Shoemaker, health officer of the township of Hazleton, Shiawassee county, wrote to this office July 21, 1894, relative to a neglected outbreak of diphtheria in which there occurred 9 cases with 2 deaths. His letter was as follows:—

"It might be a question, whether there was a common cause for this case and the last one that I reported, or whether one was the source of the other.

"Both families attended a camp meeting at Lennon in third week of June, when I think was the possible start of the first case; but I am not certain. It is a common practice in the country to not call a physician unless very sick, and thus a case might have recovered and attended the meeting without being disinfected.

"The last case before this reported was at the same church, with the one now sick, June 22, and was taken sick the 23d."

Diphtheria carried from Cincinnati, Ohio, to the city of St. Joseph, Mich.

Information having been received at this office of an outbreak of diphtheria in the city of St. Joseph, Mich., a "blue letter" was sent to Alfred Baldrey, health officer of that city on Sept. 13, 1894, asking that he report the outbreak to this office. Mr. Baldrey sent the following letter to the Secretary of this Board, Sept. 26, 1894:—

"In reply to your communication under date of 13th inst. I beg to report the fatal case of diphtheria referred to * * * was as follows:—

"Ida Hardke, female—age 15, taken sick June 2, '94. Died June 5, '94. Medical attendant Dr. L. I. McLin of St. Joseph. Patient was immediately isolated and every precaution taken to prevent spread of the disease. After death and burial of patient every portion of the house, privy, bed and other clothing was thoroughly disinfected by burning sulphur, further spread of the disease was prevented and no other cases have occurred in the family or neighborhood. The source of contagium was a young woman, a cousin of the girl attacked, who had been acting as a nurse in a hospital at Cincinnati, Ohio, where this disease was being treated and who had had an attack herself."

Diphtheria in Laingsburg, Shiawassee County.

An outbreak of diphtheria occurred in the village of Laingsburg, Shiawassee county, which lasted from Feb. 1, to Dec., 1894, and in which there were 72 cases, with 9 deaths.

The correspondence between this Office and parties in Laingsburg, relative to this outbreak, was quite extensive. Below is printed a portion of the correspondence which gives some idea of the circumstances in this outbreak and how it terminated.

The Secretary of this Board sent the following letter to the president of the village of Laingsburg, Aug. 29, 1894:—

"Reports from an individual, who so far as I am informed, is not connected with the health department of your village, informs me that diphtheria is present and has been for sometime, in the village of Laingsburg, and complaint is made that proper measures are not being taken to prevent the spread of the disease, and that the public-health laws are not being observed by your health officer. I have received no reports from your health officer relative to the subject, unless an unsigned card dated July 28, is one from him, in which is stated that four cases of diphtheria are present in Laingsburg. I wrote to him on July 28, and again on Aug. 13, relative to the subject, and requested that he comply with the law and make reports to this office. So far I have received no communication from him, in reply to my letters.

"I enclose a pamphlet with portions marked bearing upon the duties of local boards of health and of health officers, and trust that you and your board will take such action, promptly, as will secure the proper observance of the laws, and the better protection of the lives and health of the citizens of your village.

"I would be pleased to hear from you soon, relative to the subject."

In answer to the above-quoted letter from this Office, H. R. Sharpe, President of the village of Laingsburg, wrote on Aug. 30, as follows:—

"Yours of the 29th received and contents noted. I must say I was very much surprised to hear that the health officer had not reported to you. I saw him to-day and he tells me he sent in two reports last week. One on postal card, and one on the blanks furnished by the department for weekly (or daily reports when an epidemic was malignant). We are and have been using all the precaution that we deemed necessary, as we have had some diphtheria in a mild form, but no malignant diphtheria, and the man that reported to you (as I think it was A. D. Barnes), had a case in his family and we had the most trouble with him of any one as yet in the town, and Friday had to send an officer and threaten to arrest him if he did not keep in. We are isolating every case that we hear of having sore throat, and have had a committee visit every family and take careful note of the sanitary conditions of every place and are confining every one that has any signs of diphtheria, and under the directions of the attending M. D. using disinfectants and not allowing those affected to come in contact with those outside their immediate families until the attending

physician lets us know that there have been proper preventives used. Dr. Freeman, the health officer, tells me he has reported to you and will again at the close of this week make a complete report, and should he not do so, I would be pleased if you would let me know.

"We have all confidence in the doctor, and think he wishes to do what is right in the matter, but would be glad to be notified of neglect on his part to keep the State Board of Health properly notified of any contagious disease."

Sept. 24, 1894, F. E. Allen, Chief of the Fire Department, of the village of Laingsburg, wrote to the Secretary of this Board, as follows:—

"We have about 15 cases of diphtheria here and every one is allowed to run about as they wish. Now for the sake of our dear ones do come down and see to it that something is done to suppress it."

In answer to the above-quoted letter from Mr. Allen, the following communication was sent from this Office, Sept. 25, 1894:—

"In response to your letter of Sept. 24, relative to diphtheria,—The laws of this State give to local boards of health almost absolute control over everything relating to the public health, and if they do not exercise their power, when an epidemic of dangerous communicable disease threatens the people of their locality, they and the people who voted them into office, are responsible. The health officer is the executive officer of the board of health, and has duties to perform under the law, which he swore to obey, and if he does not perform those duties, the prosecuting attorney of the county should be given notice of the fact, and the prosecuting attorney is required by section 8442 Howell's statutes, to prosecute for all forfeitures incurred within his county.

"The public-health laws are ample to protect the people in case of outbreaks of dangerous communicable diseases, *if properly administered*, and the people immediately interested should see that the persons whom they have placed in office to administer the laws, *do their duty*.

"Anything that this office can do to aid in this direction will be cheerfully done. I have to-day made one more effort to induce the health officer to act. I expect to follow it up."

Shortly after this letter was sent to Mr. Allen the Secretary of this Board visited the village of Laingsburg, met the health officer and local board of health in the council chamber, and conferred with and advised them concerning the best measures for stamping out the disease. In that little village of less than one thousand inhabitants, there was then said to have occurred about forty cases of diphtheria. Later the health officer reported that since the first case in February there had been 72 cases, including seven deaths. It had invaded 34 families. Oct. 11, the health officer reported, to this Office, as follows:—

"I send you below a short account of diphtheria epidemic in Laingsburg:—

"It was brought to Laingsburg Feb. 12, 1894, by a nurse who had been at Bath, nursing diphtheria patients. She and her daughter had it after she returned to Laingsburg. The next case occurred, May 2, 1894,—one case, a girl of 18 years. The next case June 3, in Robert Miller's family, four cases. And from this time on we have had cases with us until Sept. 1, when we had the epidemic checked, and there was not a case in the village or township. Sept. 1, the school started and the disease broke out again and spread rapidly until we had Sept. 20, (12) twelve cases, and seven houses quarantined. We think it was spread by mild cases coming down in school. We closed the school, and at this writing have only one case; the others all recovered. School starts again next Monday.

"We have had in all seventy-two (72) cases and seven (7) deaths, in thirty-four (34) families. We believe the disease has spread by not being able to enforce the isolation of patients.

"We believe now we have the epidemic stopped. Any information on the subject will be acceptable, and if you want a more complete report we will try and furnish it."

Neglected Outbreak of Diphtheria in Portland village, Ionia county.

An outbreak of diphtheria occurred in the village of Portland, Ionia county, which lasted from May 21, to Nov. 18, 1894, and in which there were 23 cases, with 10 deaths. Finally, about October 1, the disease took on such a malignant form that the citizens became alarmed, and the Secretary of this Board was requested to visit Portland and advise them of the best methods to be used in controlling the disease. Previous to this, the health officer had requested that the Secretary go or send a man to Portland to collect the facts which the law requires the health officer to collect and report to the Secretary of the State Board of Health. The correspondence was as follows:—

The Secretary of this Board wrote to R. W. Alton, M. D., health officer of Portland village, Aug. 9, 1894, as follows:—

"It is alleged that Mrs. Glenn Towsley died of diphtheria at Lowell last Friday, and that the body was removed to Portland for burial, and arrived in your village at 9:30 A. M. Saturday. I would be pleased to learn all of the particulars relative to the removal of the body from Lowell to Portland, that you can give me. Was your permission, as health officer, obtained before the body was brought into your jurisdiction? Did you supervise the burial of the body? Was the casket opened after its arrival at Portland or at the cemetery? How was the body prepared for transmission to your village?

"Please give me all the information you can. There has been no diphtheria reported to this office from Lowell, and I have just written to the health officer of that village relative to the subject."

Dr. Alton answered the above-quoted letter from this Office, Aug. 12, as follows:—

"In reply to your letter of the 9th inst. in regard to the death of Mrs. Towsley of Lowell, I will say this:—

"I was not notified of her death or that she was to be brought here for burial. I was on hand, however, at the time the body arrived here and saw to its interment.

"The casket I am told was air-tight and also enclosed in a very close and large box. It was not opened here, and only enough people to lower the box were at the grounds. The people that came with the body, they said, were well fumigated before they left Lowell and also wore clothing that had not been near the body or the patient. The people were fed at a house here where there were no children and the house was well fumigated with burning sulphur after they left. I have had no word from the health officer of Lowell."

In answer to the above-quoted letter from Dr. Alton, the Secretary of this Board wrote Aug. 13, as follows:—

"Accept thanks for your letter of Aug. 12, relative to the death of Dr. G. Towsley's wife at Lowell and the burial of her body at Portland. I am pleased to learn that precautions were taken to avoid an outbreak of the disease in your locality. I am just in receipt of a card from Dr. O. C. McDaunel, the health officer of the village of Lowell, in which he states that Dr. Towsley had 'sore throat' which was said to be 'tonsillitis,' ten days before his wife was taken sick, and that *he* (Towsley) had treated a case of diphtheria ten days before *he* was taken sick with the 'sore throat,' and that no precautions were taken until after the death of Mrs. Towsley."

Aug. 18, 1894, Dr. Alton reported diphtheria present in his jurisdiction, and on Sept. 30, he sent the following letter to the Secretary of this Board:—

"I have no blanks on which to make a final report. Please send some. I would like very much to give you all points and what we are doing in our epidemic of diphtheria here which is proving to be very fatal. I find it impossible to make each report on time and as full as I would like. Starting from now, I will try still harder to systematize my work.

"Our epidemic is a malignant one. Three cases have proved fatal in less than a week and five still sick. Would it not be a good plan to send a man from your office, over here to stay a day and get all

points that your board wants and help us out on finding the cause? I am sure myself that these cases are not due to the contact of the children but to some cause that is common to our town.

"The cases that have died we bury at night and none but those that are absolutely needed are present. Let me hear from you or send a man over for data at the Board's expense."

Inclosed with this letter from Dr. Alton was his weekly report of the outbreak, on an "M" blank. On receipt of these communications from the health officer of Portland, the Secretary of this Board wrote to him, Oct. 1, as follows:—

"Accept thanks for your weekly report on blank 'M,' and for your letter relative to diphtheria, also for your note relative to the final report of an outbreak of scarlet fever. I enclose herewith another blank 'K' for the final report of scarlet fever.

"Relative to diphtheria,—You say that the disease occurred 'without exposure.' Diphtheria does not occur in a person spontaneously, but is contracted from some infected person *or thing*. If the children who are sick did not come in contact with an infected person, then they became infected by coming in contact with some infected *thing*, and that thing should be sought for. That is the only local cause which is possible.

"In your report you say that five were sick at the beginning of the week, and six taken sick during the week, which would make eleven sick in all; that three died, none moved out or recovered, and five sick at the end of the week, which leaves three unaccounted for. We have no appropriation for a State Inspector of Communicable Diseases. I cannot now spare the time and money to go to Portland.

"P. S. This is the time of year when diphtheria tends to increase. It is especially important that it be stamped out now. I enclose a pamphlet marked, which may give you a hint of why it is increasing in Portland."

October 1, Grant M. Morse, member of the board of health of Portland township, wrote to the Secretary of the State Board of Health, as follows:—

"Have you a compilation of the Health Laws of Michigan up to date; if so will you kindly mail me a copy?

"We seem to be on the eve of a diphtheria epidemic here and the local physicians so far seem powerless to check it. We want all the information on the subject possible to get. It would be very gratifying to the local board of health, to have you present if only for a flying visit. I am not authorized to employ you or even invite you but have heard several of the members express the above sentiment. Awaiting your valued reply.

October 2, the Secretary answered the above-quoted letter from Mr. Morse, as follows:—

"In accordance with your request of Oct. 1, I have sent you by mail this afternoon a copy of the Public Health Laws in force in Michigan, and several copies of the pamphlet on the restriction and prevention of diphtheria.

"I note what you say about visiting Portland. I had received an invitation from Dr. Alton, health officer of the village, and, this morning, the President of the village called and gave me a very urgent invitation to visit Portland. I leave for Portland on this afternoon train, and shall hope to see you."

The Secretary of this Board visited the village of Portland, met the health officer, local physicians, local board of health and others, and advised a course of action by the householders, physicians, health officer, local board of health, and prosecuting attorney if necessary.

On Oct. 3, 1894, the President of the village sent a card to the Secretary of this Board, stating as follows:—

"Please send by first train, 300 diphtheria leaflets. Matters are looking better this morning, and stringent measures are being taken."

On Oct. 5, the following letter was sent from this office to Duncan Kennedy, President of the village of Portland:

"In accordance with your postal-card of Oct. 3, I sent you yesterday by American Express, charges prepaid, 300 copies of our pamphlet on the restriction and prevention of diphtheria, which I hope will be of use to you, in aiding in the formation of a correct public opinion on that subject."

"I am glad to know that 'matters are looking better this morning and stringent measures are being taken.'"

It is probable that there was not sufficient care taken in the isolation of patients, and convalescents were allowed to go in public too soon, in this outbreak. The first cases occurred in May and June and the reports of these cases show that the isolation and disinfection were not thorough. It is plain to be seen that the local health officer was looking for some occult cause other than its spread from person to person as is well known now to be the rule. About the first of August a family moved to that vicinity and two cases occurred then. The school opened in Sept. The convalescent went to school, and from the health officer's report for the week ending October 27, we may suppose that children came down with the disease in the school room. He stated that "No. 1, don't know. No. 2, was in the school room where all other children were taken sick. Nos. 3 and 4 helped clean house where diphtheria had been."

Diphtheria in Huron County.

During the year 1894, numerous cases of diphtheria and deaths from that disease, occurred in Huron county. In the previous year the disease had been carried into the southern part of Huron county by persons from the infected lumber camp (Camp No. 8), located in Alcona county. An account of these outbreaks in Paris, Bingham and Dwight townships will be found on pages 179-188 of the annual report of this Board for 1894.

On October 27, 1894, a petition was sent to this Office asking that some competent person be sent to Huron county, to investigate the conditions there and determine if possible why diphtheria was so prevalent in certain parts of that county, and recommend the best methods for its restriction.

Dr. J. W. Hauxhurst, of West Bay City, was requested to make an investigation in the townships in Huron county, where diphtheria was reported present. His report of the investigation, the correspondence which passed between this office and health authorities in Huron county, relative to diphtheria, and a table showing the localities in Huron county from which diphtheria was reported in 1893-4, with the numbers of cases and deaths for each year, are given below:—

Aug. 2, 1894, Henry Johnson, M. D., health officer of Caseville township, wrote to the Secretary of this Board, as follows:—

"There has come to my knowledge a family afflicted with diphtheria. There have been six cases * * *

"The Shafers did not know that they had diphtheria as it was of a mild form. I was called there July 27, and after learning the nature of the disease placed the family in quarantine and have taken all necessary precautions. Am keeping a close watch on all persons that have been exposed."

On Aug. 4, leaflets on the subject of diphtheria were sent from this Office to Dr. Johnson, for distribution among the neighbors of families who had the disease. The following telegram was received from Dr. Johnson, on Nov. 16, 1894:—

"Send expert on diphtheria. Immediate answer."

In answer to the above-quoted telegram, the Secretary of this Board telegraphed Dr. Johnson, as follows:—

"No reason known here for expert. You should keep me 'constantly informed,' as law provides."

Dr. Johnson wrote to this Office, Nov. 17, as follows:—

"The two cases reported for this week, were reported to the Board of Health by Dr. Austin. I do not think they are diphtheria, but nothing more than a catarrhal pharyngitis due to atmospheric influence. Will inform you next week in regard to the cases. Shall keep them quarantined."

In his final report of this outbreak, Dr. Johnson gives the source of the disease as from Elkton, but no diphtheria was reported for Elkton or Oliver township, in 1894, until Sept. 22, over four months after the first case was taken sick in the outbreak in Caseville township. Stephen A. Mosher, health officer of Chandler township, also gave the source of contagium of an outbreak of diphtheria in his jurisdiction as from Elkton. Mr. Mosher's letter to the Secretary of this Board was as follows:—

"In compliance with your request I herewith submit the following special report of the cases of diphtheria in this township, that have been reported to me by attending physicians:

"Whole number of families, 11 * * * . Total number of cases, 40.

"The above cases have all been isolated as much as possible and diphtheria cards placed in front of their houses. With co-operation of the school boards and the trustees of churches I have effected the closing of all public gatherings in town, and used every other precaution within my knowledge and power in each house where there was diphtheria. After all the cases were declared well, I have disinfected the homes of same. * * * In my opinion this epidemic of diphtheria originated in the village of Elkton, and has spread from there more or less over four townships, to wit: Oliver, Chandler, Colfax and Caseville.

"The primary cause in my opinion is either the drainage of a large marsh near Elkton or bad and impure wells in the village or both of these combined. There seems to be one very striking peculiarity that one family, I am told, by the name of Snyder, in the village of Elkton, have had it three years running. It would seem that there was something wrong with the house or its environments.

"This is the third season I think that it has started in Elkton and each season has spread a little farther and fears are entertained that next will be worse than this.

"It would seem that the water in some of the wells should be analyzed and perhaps some other matters investigated, and if possible stamp out the primary cause.

"I thank you for assistance and instructions."

On October 6, 1894, Mr. Mosher had written to this Office relative to same outbreak mentioned above, as follows:—

"Diphtheria seems to jump from one part of the town to another, and makes its appearance where we least expect it. I have ordered the schools and churches closed. The Supervisor has ordered them opened, and called the board of health together to restrain me. But they have not yet taken any action. A very large majority of the people are in favor of closing them. What shall I do? I want to do the right thing."

October 10, the following letter was sent from this Office in answer to the one from S. A. Mosher, quoted above:—

"Accept thanks for your letter of Oct. 6, relative to diphtheria. You say that you have ordered the schools and churches closed, and that the supervisor has ordered them opened, and ask what you shall do. I enclose herewith a pamphlet, marked, which contains the law relative to some of the duties of the health officer. The law requires that you shall do certain things, unless you have been instructed by the board of health of which you are the executive officer, '*to do otherwise.*' If your board of health has '*otherwise,*' than to comply with the requirements of Act 137, laws of 1893, you will

"*As a rule*, this State Board of Health does *not* advise the closing of schools, churches, etc., where dangerous communicable diseases are present, but *does* advise the complete isolation of all *sick or infected* persons. There may be in this instance exceptional circumstances which make it important to close schools."

In a final report made to this office, Nov. 26, 1894, S. A. Mosher, stated that "The dead were all buried on their own premises, with the privilege of being buried in the cemetery in frozen weather." Relative to this removal of dead bodies, the Secretary of this Board wrote to Mr. Mosher, Dec. 8, 1894, as follows:—

"On your final report of the outbreak of diphtheria in Chandler township (dated Nov. 26, 1894) you say 'the dead were all buried on their own premises with the privilege of being buried in the cemetery in frozen weather.'

"No health officer or local board of health should permit the disinterment and removal of a person dead from diphtheria, at any other season of the year than spring or summer (preferably June or July) because diphtheria is most easily spread during the colder months. If such disinterment and removal of diphtheria corpses is absolutely necessary, it should be done *only* during the spring or summer months.

"No child should be permitted to be near the place of disinterment or reinterment; and no grave-digger or other person who is present on either of these occasions should go near a child without first having a change of clothing and a thorough bath, and disinfection of the hair and beard, and of the throat, and then not during the existence of any sore throat which may be contracted on such occasion."

September 24, 1894, the Secretary of this Board sent the following letter to Dr. D. J. McColl, health officer of Oliver township:—

"The following is a copy of an anonymous communication received to-day:

"'Several cases of diphtheria have again commenced its work in this town, which should be looked after at once. We had a siege of it here last fall and we do not want to see another such dose.

"ELKTON, MICH., HURON CO.'"

"Will you have the kindness to inform me whether there are cases of diphtheria in your jurisdiction? and if so, please make reports to this Office. I enclose our regular circular letter relating to the subject."

In answer to the above-quoted letter from this Office, Dr. McColl wrote, Sept. 25, as follows:—

"Diphtheria made its appearance here on Wednesday last. Of mild form but there are a great many cases. It is confined to school children, and with two exceptions children attending the Jr. Department. This led us to suspect that it had been caused by impurities in or around the school-building. During holidays some changes and repairs were made in both rooms; and as in the outbreak of '93 some children were taken with diphtheria in the school-rooms (one, two days prior to death). We have closed school and thoroughly disinfected the buildings and grounds.

"There have been no deaths yet but 3 are seriously ill, one of whom cannot live more than 4 or 5 hours.

"Inclosed find a complete record of present cases.

"I wrote notifying you of the outbreak Thursday but the letter I see to-day has not been posted."

October 27, 1894, the following petition was received by the Secretary of this Board:—

"*Meade, Oct. 27th, 1894.*

"We, the undersigned, health officers and officials of the townships of Meade, Hume, Lake and Chandler, in the County of Huron, State of Michigan, would represent that diphtheria has been prevalent in the neighborhood of Elkton, in the township of Oliver for a period of nearly one and one-half years with no sign of abatement, costing this county last year nearly four thousand dollars besides a number of lives, and would urgently request that some competent man be sent to investigate the causes of this condition of things and assist the local authorities in stamping it out.

FORD W. SELLARS, M. D., *Health Officer Meade.*
LEONARD R. THOMAS, *Supervisor of Meade.*
JAMES MCSHNURRAY, *Health Officer Hume.*
ROBERT GOTTS, *Health Officer Lake.*
JAMES EDDY, *Supervisor of Hume Township.*
HUGH K. FITCHETT, *Member of Town Board of Chandler.*
THOMAS COULTER, *Clerk of Meade Township.*"

On the same day that the above-quoted petition was sent to this Office, S. A. Mosher, health officer of Chandler township, Huron county, sent the following letter to the Secretary of this Board:—

"Every means in my power has been used to prevent spread of diphtheria in this township. Of course many obstacles have been thrown in the way by people who dislike to be inconvenienced.

"It seems to follow a line of drains and log houses, also where open wells are adjacent to barn yards and privies. The disease has apparently spread from the village of Elkton into the towns of Colfax, Chandler, Winsor and Caseville. It has been raging with some intervals for over a year and a half. People in adjoining towns are becoming alarmed and asking for more efficient measures in the affected towns to prevent its spread.

"I am informed by the health officer of the town of Meade, Dr. F. W. Sellars, that the health officers of four towns have joined in asking the State Board of Health to send a competent person to this locality with full power to investigate and if possible to stamp out this disease. I most heartily endorse their request.

"I think it has reached a magnitude with which the local boards of health are unable to cope."

On receipt of the above-quoted petition and letter, the Secretary of this Board telegraphed Dr. J. W. Hauxhurst of West Bay City, as follows:—

"Can you visit several localities in Huron county, investigating diphtheria."

To which Dr. Hauxhurst answered the same day (Oct. 31) by telegram, as follows:—

"Can leave Friday morning, seven o'clock."

The Secretary of this Board sent the following letter of instruction to Dr. Hauxhurst, Nov. 1, 1894:—

"Please accept thanks for your telegram of last evening telling me that you would be able to leave Friday morning, for Huron county. * * *

"I have written to Ford W. Sellars, M. D., Pinnebog, in response to the petition signed by him and officers of three other townships, acknowledging the receipt of the petition, telling him that I hoped you would be the one to go, and that we looked to him and the officers who had appealed to this office, for aid to you with all information possible; and that whoever represents this board would be instructed to aid local officers to the best of his ability, and to let this office know if it can in any way aid in stamping out diphtheria.

"I understand that there are many Polish inhabitants, so you will need to see and impress upon some of the most intelligent ones the best measures to restrict diphtheria. I send you by this mail a few pamphlets and leaflets on the subject, some of them in the Polish language, but I am not sure they will reach you before you start. I duplicate the package for you in care of Dr. Sellars.

"Yesterday I mailed you a copy of the petition for this investigation; to which I append a statement of the diphtheria in Huron county, reported to this office in 1893 and 1894. I also sent a copy of our pamphlet, on which I marked a few parts of it which seemed to me to be especially important. I sent ten of each of the pamphlets to each person named on the petition, and also to the health officer of Chandler township. I shall be glad to send them to any officer or person whom you may designate.

"I send you herewith a blank voucher for your bill.

"I should like to receive from you any information which will correct or supplement the statement of facts relative to diphtheria in any township in Huron county, or connect it with the disease in any other locality.

"I mailed you yesterday a copy of the State quarantine law, under which this investigation is made. I wish you would study the subject thoroughly, with a view to seeing whether or not it is necessary or important for this Board to establish a system of quarantine, to restrict the disease to the part of the State where it now is. I enclose herewith another copy of that law."

Nov. 1, the following telegram also was sent to Dr. Hauxhurst:—

"If practicable go first to Pinnebog, get letter to-night."

Nov. 4, 1894, Dr. Hauxhurst wrote to this Office as follows:—

"Please mail to Dr. D. J. McColl, health officer of township of Oliver—P. O. Elkton—printed matter bearing on diphtheria, and urge upon him the importance of rigid quarantine for every case of the disease which occurs, and the necessity of his personal attention in the disinfection of houses where the diseases has been, before the quarantine is broken.

"The health officer of township of Chandler should be also supplied with such matter and instructions from your office. These are the only townships where the disease was reported to me viz.: Three cases in Oliver, and two in Chandler.

"My report will be sent to-morrow or Tuesday."

In reply to the above-quoted letter, the Secretary of this Board wrote, Nov. 5, as follows:—

"Accept thanks for your letter of Nov. 4, relative to your visit to Huron county. I will comply with your request, and write to the health officer of Oliver township, Dr. D. J. McColl; and to the health officer of Chandler township, S. A. Mosher; and urge upon them the urgent necessity of strict isolation and thorough disinfection in cases of diphtheria. I will also send them another supply of pamphlets on the restriction and prevention of that disease.

"I infer from your letter that you did not receive my letter to you of Nov. 1, the original of which was sent you at West Bay City, and a copy of it to you at Pinnebog. With the letter and copy was a hektotograph copy of a statement (like the one enclosed herewith), showing that diphtheria was still present (judging from last reports from the health officers), in six townships in Huron county, viz.: the townships of Paris, Oliver, Caseville, Chandler, Colfax and Winsor."

The following letters were also sent from this Office, Nov. 5, to Dr. D. J. McColl, health officer of Oliver township, and S. A. Mosher, health officer of Chandler township:—

[To Dr. McColl.]

"On Sept. 24 I wrote to you relative to an outbreak of diphtheria in your jurisdiction—Oliver township. I have received no reports from you since your weekly reports on blanks 'M' for the weeks ending Sept. 23, 29, and Oct. 6, in which you report in all 26 cases and one death, as having occurred up to the end of the week ending Oct. 6. Will you have the kindness to forward reports for the weeks ending Oct. 13, 20, 27, and Nov. 3? The law requires that health officers keep the Secretary of this Board '*constantly informed*' respecting every outbreak of a dangerous communicable disease which occurs in their jurisdiction. See Section 1, of Act 127, Laws of 1883, pages 3 and 4, of the enclosed pamphlet.

"I would respectfully call your attention to the paramount necessity of complete isolation of all persons who are sick or infected with diphtheria, and the thorough disinfection of rooms, clothing and infected articles, as recommended in the pamphlets issued by this Board. I send you 25 of those pamphlets by this mail, and trust that you will distribute them where they will do the most good.

"The law requires that the health officer shall do the disinfecting himself."

[To Dr. Mosher.]

"By this mail I send you 25 more pamphlets on the restriction and prevention of diphtheria, which I trust you will distribute where they will do the most good. I also enclose herewith a pamphlet, marked, bearing upon the duties of health officers and of local boards of health. I wish to impress upon you the absolute necessity of the isolation of all persons sick or infected with diphtheria, and the thorough disinfection of all rooms, clothing and infected things where the disease has been. The law requires the health officer to do the disinfecting.

"I would be pleased to have you inform me just what you and your local board of health are doing to restrict the spread of diphtheria in your jurisdiction at this time. Please make such a special report."

Nov. 5, 1894, Dr. Hauxhurst made his report of the investigation, to the Secretary of this Board, as follows:—

" *West Bay City, Mich., Nov. 5, 1894.*

" *Doctor Henry B. Baker, Secretary State Board of Health, Lansing, Michigan.*

" DEAR DOCTOR: According to agreement between us, I left my home at 6:30 A. M., Nov. 2, for Huron county, via. Saginaw, Tuscola and Huron railroad. I learned that the station of Elkton was the nearest point on the road to Pinnebog, which place I was instructed to visit first, and I therefore left the cars at the former place.

" I immediately called upon Dr. D. J. McColl, of the village, and found that he was health officer of the place, and of the township of Oliver as well.

" He informed me that diphtheria had prevailed in Oliver township, breaking out at intervals, for a period of nearly two years, and that there were now three cases, one being in the village, and which he had first seen the day before my arrival. I saw this child, about two years of age, and the only child in the family. The disease was typical enough to admit of no doubt in the diagnosis, but gave promise at the time of being moderate in character, and one which might yield readily to treatment. The house and premises were under quarantine, and a blue card with large black letters—Diphtheria—printed upon it. If all persons except the Doctor are excluded from communication with the house, I think no extension of the disease may be looked for from this point.

" I saw, also with him, a woman whom he had that day been called to treat for sore throat, but I thought this case was one of simple tonsillitis. Isolation and cautionary measures were advised until plainer evidences appeared, or until the inflammation abated.

" I then had a meeting with Dr. McColl and clerk of the local board at the doctor's office. They claimed that isolation and strict quarantine had been enforced with every case, and that no carelessness had been permitted either on the side of those confined or those unaffected. The public schools had been closed since Sept. 20th, and the churches had been closed to public worship from the same date up to Oct. 18th.

" I advised the Doctor to assume full control of the disinfection of houses and their contents after breaking quarantine, following the rules laid down by the State Board of Health as printed in their pamphlets.

" He is thoroughly competent to make an efficient health officer, and I believe no fear need be felt by the people of his jurisdiction of an alarming epidemic if they will but assist him by their obedience to his requests, and by showing their willingness to comply with the law relative to the prevention and spread of contagious diseases.

" And I might add that this statement will apply generally to all other points visited by me.

" Finishing the investigation here, I hired a man with livery to drive me to Pinnebog, and on the way I visited the township of Chandler. Dr. McColl had informed me that he was treating two cases in this township, and had just done with three others, which were convalescing. He stated also that either Dr. Sellars or himself would be called to treat any cases occurring in this township. I called at the health officer's home but he was away. His wife corroborated Dr. McColl's statement, and claimed that her husband was very strict about placing all cases under close quarantine.

" Driving thence to Pinnebog, I met Dr. F. W. Sellars. I found him a very intelligent man, and as his practice extends over several townships he is acquainted with nearly every person for miles about him. He said the people of the townships named in the petition to your Board were not alarmed that an epidemic of severe proportions was now or about to be upon them, but the fact that now and then a case had appeared in various localities of the townships about them for nearly two years is what led them to join in the petition to the end, if possible, that the disease might be wholly stamped out through the instrumentality of your assistance. They felt that one sent by you amongst them would prove an impetus to stir all the local health authorities to duty, and encourage all the people to renewed watchfulness for their mutual protection. No diphtheria exists in Meade township, of which he is health officer.

" It was now late in the evening, but I secured another livery, and was driven to Lake township through muddy roads and rain. Unfortunately Mr. Gotts, the health officer, was in Caseville, and I did not see him. His wife assured me there were no cases of diphtheria in Lake township.

" I then returned to Pinnebog, where I found the mail for me from your office, and which had just then arrived. I had further conference with Dr. Sellars over the situation, and it was his opinion that nothing more could be added to the investigation about there than what I already knew. I left the leaflets you sent me with him, and he will make use of them through the townships about.

" From Pinnebog I was subsequently driven by livery, touching townships of Hume, Dwight and Lincoln. No diphtheria exists in these townships.

" I had now visited all the townships named in the petition, besides Oliver, and was convinced that to prolong my stay over Sunday would be a needless expense to the State, without giving to the people there, under the existing circumstances, more knowledge pertaining to the restriction of contagious diseases than can be given them through the printed pamphlets furnished from your office.

"If the truth was told to me, only five active cases of diphtheria exist in the seven townships touched by me—Oliver 3, and Chandler 2. These are under strict quarantine, and are attended by skillful physicians.

"No reason is known to me why this district should be quarantined against, by the rest of the State, or any part of it; and if the health officers of the various townships in Huron county will work in harmony and in earnest for its suppression, diphtheria can be stamped from among them.

"The health officer of a township, having knowledge of a person or family bearing germs of the disease, and who may be about to move to an adjoining township, should immediately notify the health officer of the township to which such persons are to go, of their coming, and advise a watch upon them. This one precaution alone will go far towards suppressing its spread.

'Statements concerning the origin of cases, and the exact locality whence the exposure came, are very conflicting in this investigation.

"One statement by Dr. Sellars will serve to show how a case at large may furnish the contagium to infect a room full of innocent children, and establish the disease over a large area in a few days.

"A man living in the township of Chandler came into Pinnebog with farm produce to sell about the village, and brought his sick child with him to be seen by the doctor. Upon examining the child's throat the doctor found a malignant case of diphtheria, in an advanced stage. The child was at once sent home, where he died the following day, and within a few days more two other children in the family succumbed to the malady. Had the doctor been away the child would have been left in his drug-store until his return, and in the meantime a dozen or more children on their way from school, and who commonly stop in the store, would have contracted the disease. I recite this account as being the probable explanation for the rapid spread of cases in Paris and other townships there in 1893.

"We see that the great safeguard against epidemics of contagious diseases anywhere is first and most prominent in the intelligent and honest physician, and next in the capable and courageous health officer These with a community obedient to law need only the knowledge dispensed from your office to reach the minimum practicable by restriction.

"Before closing this report I would recommend that hereafter when any district calls for an investigation at your hands that a time and place of meeting first be arranged for, before a representative is sent, between all the local health officers of the territory to be investigated, the physicians in many cases, and such representative, in order that these officials may be personally consulted, and a plan of action formulated which will work harmoniously and more effectively throughout the district.

"My failure to meet health officers in this investigation, and in previous ones, has been an annoyance and in some respects rendered the work done incomplete.

"I expected to find diphtheria in all the townships calling for the investigation, and I did not understand that I was instructed to go to townships of Paris, Caseville, Winsor, etc.

"However, I trust this report will show you the needs of that part of our State in the direction of protection against contagion, and I hope the people there will see the importance of willing obeyance of the laws relative thereto, and which will surely promise them the greatest security to healthful living.

"Very respectfully submitted.

"J. W. HAUXHURST."

The following article appeared in "The Morning Press," (Lansing) Oct. 31, 1894:—

"DIPHTHERIA IN HURON COUNTY.

"OVER $4,000 EXPENDED BY THAT COUNTY LAST YEAR.

"The health officers of the townships of Meade, Huron, Lake and Chandler in the county of Huron, have memorialized the state board of health to send a member of that body to investigate cases of diphtheria in the township of Oliver, where that disease has been prevalent for over a year. During that time it has cost the county over $4,000 to fight the disease, and many lives have been lost.

"The matter is now under consideration by the board, and some action will be taken. The board has at different times asked the legislature for a law to cover just such cases as these. But a short time ago an appropriation of $4,000 was requested for the purpose of defraying expenses of inspectors; unfortunately the legislature failed to look upon the request favorably, and as a result the board has been handicapped in much of its works. As will be seen, the county of Huron alone has expended $4,000, much of which would have been saved had the state board been able to take immediate hold of the matter.

"Dr. Baker is inclined to think that section 1, of the law of 1893, relative to the prevention and spread of dangerous communicable diseases may cover this case. Section 1 of that law reads as follows:

"Whenever shall it be shown to the satisfaction of the state board of health that cholera, diphtheria, or other dangerous communicable disease exists in any foreign country, neighboring state, or locality within this state, whereby the public health is imperiled, and it shall be further shown that immigrants, passengers or other persons seeking to enter this state or to travel from place to place within this state, are coming from any locality where such dangerous communicable disease exists, and are likely to carry infection of such dangerous communicable disease, the state board of health shall be authorized to establish a system of quarantine for the state of Michigan or for any portion thereof."

Localities in Huron County in which Diphtheria was present in 1894; giving the reported numbers of cases and deaths, and the source of the infection, where stated in the reports; also the same information for these localities in 1893.

Localities in Huron county.	1894.			1893.*		
	Source of infection.	Cases.	Deaths.	Source of infection.	Cases.	Deaths.
Bingham Tp.	Unknown	6	0	Oscoda, Iosco Co.	8	2
	" "	2	0			
Brookfield Tp.	Indefinite	1	0	Unsanitary conditions	5	4
Caseville Tp.	Oliver Tp.	12	2	Not known	2	2
Chandler Tp.	Oliver Tp.	53	8	Not stated	8	0
Colfax Tp.	Not stated	6	0			
Huron Tp.	Not known	1	0	Not known	2	0
				Oscoda, Iosco Co.	3	0
Oliver Tp.	Taken in school	43	2	Previous cases in same family	35	10
Lake Tp.	Chandler Tp.	5	0			
Paris Tp.	Unknown	47	17	Not stated	2	0
				Oscoda, Iosco Co.	42	17
Winsor Tp.	Oliver Tp.	6	1	Oliver Tp.	2	1
	Total numbers	182	30		104	36

*These localities for 1893 do not include *all* the jurisdictions in Huron county from which diphtheria was reported in 1893, but only those in which the disease was also reported for 1894.
From Huron county, in 1893, the total reported number of cases was 151; deaths, 47.

Diphtheria Supposed to have been Contracted from a Cat that had Sore Throat.

The "Isabella Co. Enterprise," of Sept. 7, 1894, contained the following news item:—

"Died, August 29th, of diphtheria Howard W., aged 10 years, eldest son of Mr. and Mrs. John T. Chamberlain, of Deerfield township. Six members of the family have been down with the dread disease. The family cat—a great pet, and which often slept with one of the little boys, had a running sore on its neck and this little boy was the first to come down with the disease. Two have died and the other four, including the mother, are convalescing. There are now no cats in that family."

The above-quoted item coming to the notice of the Secretary of this Board, a letter was sent to Dr. L. C. Payne, health officer of Deerfield township, asking him to report the same to this office. No reply was made to the first letter, so the following one was sent to Dr. Payne, from this office, Sept. 10, 1894:—

"Sept. 7, I wrote to you relative to an outbreak of diphtheria in your jurisdiction. So far I have heard nothing from you relative to the subject. At the time of writing the letter of Sept. 7, I was unable to give you the location of the persons alleged to be sick, but was informed that the cases had been reported to you. The following item appeared in the 'Isabella Co. Enterprise' of Sept. 7, which is printed at Mt. Pleasant.

[The above-quoted item.]

"Will you have the kindness to make reports to this office, and also give me all the information you can relative to the cat which 'had a running sore on its neck?' Have you good reason to believe that the cat had diphtheria?"

On the same day (Sept. 10), the Secretary wrote to Dr. C. D. Pullen, health officer of the city of Mt. Pleasant, quoting the above newspaper item and stating as follows:—

"I infer that these are the cases of diphtheria to which you refer in your cards of Aug. 25 and Sept. 7, which you say are your patients but not in your jurisdiction. I would be pleased to learn more about the cat with the 'running sore on its neck,' and any information which you can give me will be thankfully received. If there was a cat with a sore throat, have you any reason to believe that it had diphtheria? Can the source of the disease in this family be traced to any other person outside of the family?

"I would be pleased to receive as full a history of this outbreak as possible, and enclose a stamped envelope for your reply."

Sept. 11, Dr. Pullen answered the above-quoted letter from this office, as follows:—

"The paragraph from the Enterprise is true with one exception; the cat had no sore on the neck but seemed to have a sore mouth and throat.

"There have been no cases of diphtheria in the county [?] for a year, and never much trouble in Deerfield.

"The house in which the cases occurred stands on the bank of the Chippewa River, about ten rods from the water, on a high sandy knoll, about 15 ft. above the river and 5 ft. above the surrounding field. The soil is dry, and house and drainage perfect.

"The river is only knee deep or less, hard gravel bottom, with here and there a jam-pile of drift-wood left by the spring flood. These of course contain much decaying matter.

"The house is an old log structure used one summer for a hog-pen, finally cleaned out and used two years for a dwelling house. The water supply is from a spring 15 rods from the house and about 5 to 10 feet higher so that could not be contaminated from the house.

"The children were from 6 months to 12 years old, the mother 36 and the nurse 30. The children, all but the baby, have played in the river all summer.

"Now about the cat. About two weeks before the first one was taken sick the cat was found coughing and sneezing, the nose discharging freely. The father of the children tells me every time the cat coughed pieces of a stuff, looking like the membrane in the boys' throat, would come up.

"The neighbors have all killed their cats and there have been no new cases. I have tried to give you the facts in the case as I know them and from my knowledge of the case I should lay the trouble to the cat, although the surroundings may have caused it, but they are not as bad as other places I visit and the people are never sick."

Sept. 12, Dr. L. C. Payne wrote to this office in answer to the above-quoted letter sent him on Sept. 10, as follows:—

"Your pamphlets of the 7th and one letter just received this morning. In reply will say that I have visited the house of Mr. J. Chamberlain. They had the diphtheria. Mrs. C. thinks the direct cause was a very foul privy. During the sickness the house was quarantined and notices posted. There were two deaths. None isolated. The house is part logs and part frame. The log part is 16 by 22; the frame is 12 by 22, has been disinfected by burning 3 pounds of sulphur, and a quantity of pine tar; also used 4 packages of chloride of lime. They did not disinfect the privy but moved it, and buried the old vault. I ordered sulphur burned in that also. All of the discharges were buried. The clothing of all kinds was boiled in solution of chloride of lime. The first one was taken sick July 23. I got no dates as to the deaths.

"The attending doctor thought the contagium came from the cat, because the cat had a cough and was poor in flesh, but I don't think so. I think that it came from the dead carcass of a hog that some one carelessly threw in the river that runs by their very door. The hog lodged against some drift-wood about ¼ mile from the house, and was allowed to remain there until it rotted away. The stream is badly chocked with drift-wood, and it might have been caused by the gases that arise from a decaying pile of sawdust that is in close proximity to the house; both nuisances should be removed, but I can not get it done."

"P. S. There were seven sick with diphtheria at that time in Mr. Chamberlain's house."

Diphtheria Contracted by Kissing a Person who had a "Sore Throat."

Dr. S. S. French, health officer of the city of Battle Creek, in a letter sent to the Secretary of this Board on Oct. 29, 1894, made the following statements relative to the mode of spreading the contagium of diphtheria, in an outbreak which occurred in his jurisdiction, and which resulted in 29 cases with 2 deaths:—

"Early last week reports of diphtheria came in to the number of 11. Investigation revealed the fact that a birthday party was held on the 18th inst., of 30 young people between the ages of 14 and 20. The one whose birthday was celebrated was complaining of a sore throat which on the 20th was declared diphtheria. They closed their entertainment by a kissing all around, from which 10 of the 30 developed the disease. All so far are mild cases. All isolated, and all of those who attended the party and not yet sick, so far as possible, are quarantined. None as yet have died."

Duration of Vitality of Diphtheria Contagium.

Relative to an outbreak of diphtheria in Independence township, Oakland county, in which there were only two cases of the disease and these occurred in one family, the health officer, J. Goodenough, M. D., reported the probable source of contagium as follows: "Diphtheria broke out in this family several years ago, of a malignant form; six died and two recovered. The house has been repapered this spring for the first time. The question is—would the germs remain seven or eight years."

The length of time which the specific cause of diphtheria would retain its vitality under favorable conditions is not definitely known. On page 182, of the Report of this Board for 1893, will be found information bearing upon this subject, from which the following is quoted:—

"The bacilli of diphtheria remain alive a very long time in cultures; it is not rare to find colonies active, after more than six months, on serum and at the temperature of the room. 'The spittle of diphtheria patients, when dried upon a rag, the rag folded in a paper and laid in a closet at the temperature of the room, gave living cultures of the bacillus after three or five months.' Translated by Dr. C. N. Hewitt, from Annales de l'Institute Pasteur, July, 1890, 'Public Health', Minn., Oct., 1890, p. 23."

TRANSPORTATION OF PERSONS SICK WITH, OR DEAD FROM DIPHTHERIA.

Body of Person dead from Diphtheria, shipped from the city of Port Huron, to Memphis village, Macomb county.

Dec. 31, 1894, an anonymous letter, alleging that the body of a person dead from diphtheria had been shipped from the city of Port Huron to Memphis village, Macomb county, was sent to this office, by some person residing in that village. The letter was as follows:—

"Ray Sleeper died in Pt. Huron, at the corner of 7th and Union streets last Saturday morning at half past one, of diphtheria, in a very severe form. His father, mother, aunt, and uncle, who had taken care of him through his sickness came here on the noon train, and were met at the depot by friends here and taken to the home of those friends to await the arrival of the remains which were coming through by team. I would like to know if Port Huron is without a health officer, and if we here are obliged to be subjected to such iı justice. Will you please look after the matter?"

Jan. 3, 1895, the Secretary of this Board wrote to Dr. Geo. P. Hale, health officer of the village of Memphis, quoting the above letter and adding:—

"In reply to the questions,—Yes. Port Huron has a health officer. But judging from the little information which we are able to obtain from him, relative to the outbreaks of dangerous communicable diseases in that city, I infer that he is of little value to protect the people of his locality.

"Probably you will have to submit to the importation of infected bodies, persons and things, unless your board of health has complied with sections 1636 and 1639 Howell's statutes, (See page 7 of the enclosed pamphlet) and have made and published regulations. After such action has been taken by your board, you will be in condition to protect the people of your locality in such instances as mentioned in the anonymous letter."

In answer to the above-quoted letter, Dr. Hale wrote to this office Jan. 10, 1895, as follows:—

"Your letter to me in regard to the case of diphtheria and the anonymous letter you received in relation thereto has been inquired into. Not being at home at the time I made diligent inquiry and find that the anonymous letter reported the matter correctly, but neglected to state that the body did not come to this village, having been stopped one and one-half miles distant from the corporation and the driver directed to take another road to the cemetery.

"I am also informed that none of the friends wore clothing which had in any way come in contact with the contagion, and as each individual took a bath and made a complete change of raiment before leaving the house it was thought sufficient.

"Each of the friends was subjected to a spray of disinfectant just before taking the train and took all the precaution the attending physician deemed necessary to prevent the dissemination of the disease. But we do think the Health Board of Port Huron was very negligent as we are informed that the residence was not quarantined, although the patient was confined in an upper room and sulphur and other disinfectants were used in and throughout the upper chambers.

"The Health Board of this village will take the necessary precautions to prevent such infractions of the Health Laws in the future."

QUESTIONS OF LAW RELATING TO PUBLIC HEALTH.

Chester Smith, M. D., health officer of Portland township, Ionia county, wrote to this office, Nov. 26, 1894, relative to defraying the expense of disinfecting a house where diphtheria had occurred. Dr. Smith's letter was as follows:—

"Over a week since the last of a family of four children died with diphtheria in this village, which I suppose has been reported to you by the village health officer. There had been in the house the mother and two women to help care for the sick. On the death of the last child the three women moved to a home furnished, unoccupied; and have been quarantined there. The house where the children died has been locked up and fumigated since, but still remains locked up. There are eight rooms in the house, four of which have been used for the four different children.

"The father of the children is anxious that the board of health shall condemn such of his household goods as they deem sufficient. Village board refuses to act and have so instructed their health officer, Dr. Alton, claiming that it is the business of the township board to act. The township board holds it to be the duty of the village, the family being in the corporate limits.

"If you will be so kind as to give me or the president of the village board your opinion in the matter it will probably help smooth the troubled waters."

The Secretary of this Board wrote, Nov. 27, in answer to the above-quoted letter from Dr. Smith, as follows:—

"Replying to your letter of Nov. 26, relative to condemning and destroying (disinfecting) a portion of the household goods of a house in which there have been four deaths from diphtheria,—I believe a portion of such household goods should be disinfected by burning, such as carpets, etc., such disinfection being one of the '*necessaries*', it should be done under Sections 1647 and 1655 Howell's statutes, a copy of which I have marked in the pamphlet on the Work of Local Boards of Health and the local health officers, which I send herewith. The state law provides that there shall be a board of health in every township, city and *village*, and it seems that this is clearly a duty of the *village* board of health. When any expenses incurred under this section are chargeable to the county, and the amount due has been ascertained and fixed by the board of health, it is the duty of the board of supervisors to allow at once and provide for its payment. This is from a decision of the Supreme Court.—See foot-note on page 3 of our pamphlet (120), on the 'Work of Health Officers.'"

OUTBREAKS OF DIPHTHERIA IN WHICH ISOLATION AND DISINFECTION WERE ENFORCED.

The following is the substance of a few health officers' statements which are representative of the statements of those health officers whose reports indicated that they had quite carefully enforced isolation and disinfection:—

Relative to an outbreak of diphtheria in Overisel township, Allegan county, in which there were 7 cases and 1 death, the health officer, H. A. Fortuin, M. D., reported substantially as follows:—All of the patients were kept isolated; only the physician and nurse being allowed to enter the sick room in each case. The stools and contents of privies were disinfected by chloride of lime. Clothing, bedding, etc., boiled in zinc solution. The house from cellar to garret was fumigated by burning sulphur. The health officer stated that though the cases occurred in large families the disease was restricted to the first cases.

Alfred Baldrey, health officer of the city of St. Joseph, Mich., wrote to this office on Sept. 26, 1894, as follows, relative to an outbreak of diphtheria in his jurisdiction, in which the disease was restricted to one case:—

"Ida H——, female—age 15. Taken sick June 2, '94. Died June 5, '94. Medical attendant, Dr. L. I. McLin, of St. Joseph. Patient was immediately isolated and every precaution taken to prevent spread of the disease. After death and burial of patient every portion of the house, privy, bed and other clothing was thoroughly disinfected by burning sulphur. Further spread of the disease was prevented and no other cases have occurred in the family or neighborhood. The source of contagion was a young woman—a cousin of the girl attacked—who had been acting as a nurse in a hospital at Cincinnati, Ohio, where this disease was being treated, and who had had an attack herself."

F. G. Legge, M. D., health officer of Allen township, Hillsdale county, stated in his final report of an outbreak of diphtheria which was restricted to the single case, that the patient was isolated from all persons except the physician and nurse. The house was back in a field away from any near neighbors; was placarded and people ordered to remain at home. There were no exceptions to complete measures of isolation and disinfection. All rooms of the house were disinfected by sulphur fumes; clothing and bedding were boiled or subjected to sulphur fumigation. Platt's Chlorides were used to disinfect all discharges from patient; the discharges were then buried. All clothing worn by attendants was fumigated.

ESTIMATED NUMBER OF OUTBREAKS AND CASES OF DIPHTHERIA PREVENTED AND LIVES SAVED BY ISOLATION AND DISINFECTION.

Tables 10 and 11 and the following diagram compare the average numbers of cases and deaths in outbreaks of diphtheria where the measures of isolation and disinfection, prescribed by the Michigan State Board of Health, were enforced, with the average numbers of cases and deaths in those outbreaks where these measures were neglected.* By Table 11 it may be seen that during the eight years, 1887-94, there were about six times as many cases and over five times as many deaths in those outbreaks in which these measures were neglected as in those outbreaks in which they were enforced.

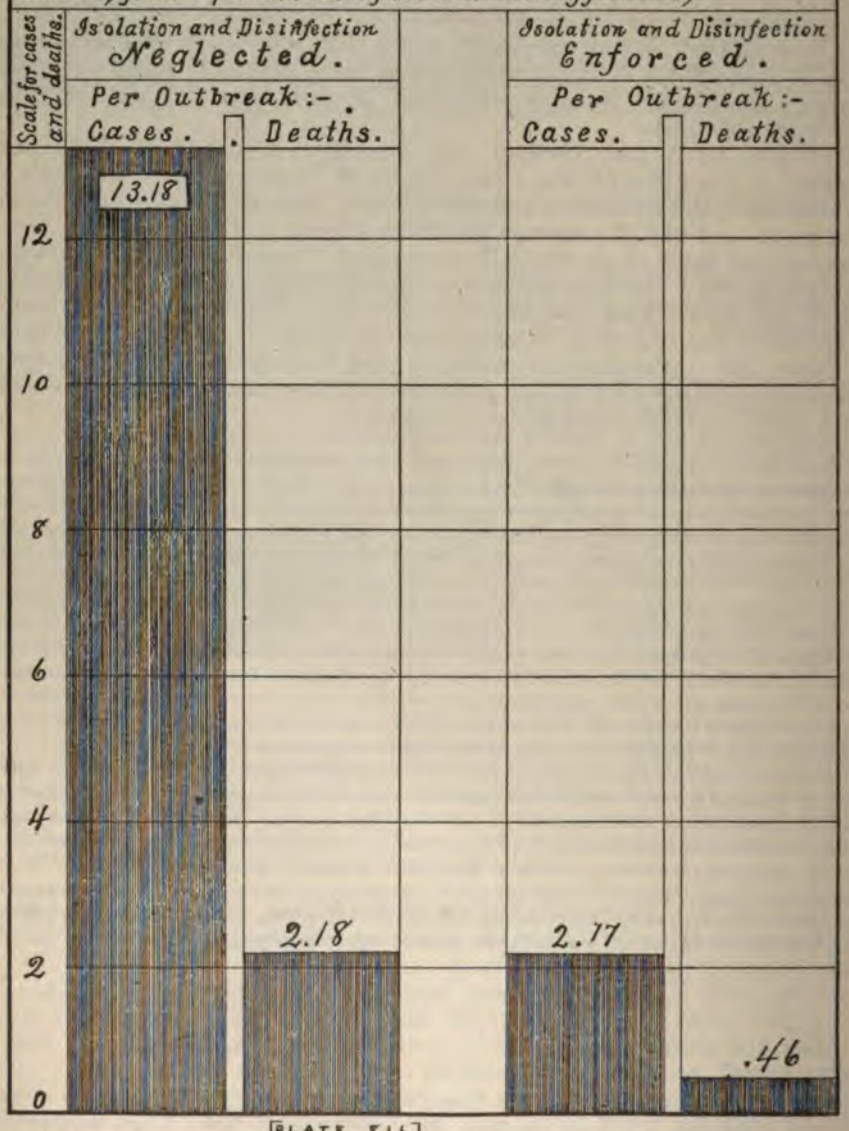
By Table 10 it may be seen that during the year 1894 there were reported to the office of the State Board of Health 420† outbreaks of diphtheria, with 2,262 cases and 404 deaths. Had no efforts at restriction been made, and had the average numbers of cases and deaths per outbreak remained the same as in the column headed "Isolation and Disinfection both Neglected," there would have occurred 5,536 cases and 916 deaths, and taking from these respectively the cases (2,262) and deaths (404) which did occur, leaves 3,274 cases and 512 deaths indicated as prevented in these 420 outbreaks, by isolation and disinfection. By the same method of computation for each year the indicated saving during the eight years, 1887-94, is 25,749 cases and 5,365 lives.

* In the compilation of the reports for Tables 10 and 11 and the diagram showing the results obtained by isolation and disinfection, every effort has been made to place the numbers of cases and deaths in each outbreak in the proper columns. If, for instance, there were only one or two cases in an outbreak and the health officer neglected to isolate or disinfect, but for some reason the disease spread no further, the number of cases and deaths were placed in the column headed "Isolation and Disinfection both Neglected." If, on the other hand, as often occurs, quite a number of persons are exposed at the same time and place outside the health officer's jurisdiction, and by proper isolation and disinfection he succeeds in confining the disease to the original cases exposed, they are placed in the column headed "Isolation and Disinfection Enforced." If, however, he neglects to properly isolate or disinfect, the whole number of these cases and deaths are placed in the "neglected" column. It is to be regretted that many of the reports received at this Office do not state exactly what was done to restrict the disease, or are not sufficiently definite to enable the compilers to decide just what was done, and they are obliged to place all such in the column headed "Isolation or Disinfection or both not mentioned, or statements doubtful."

† Whenever a break of 60 days or more has occurred in the progress of a communicable disease in a given township, village or city, it has hitherto been regarded as two different outbreaks, but in estimating outbreaks for these tables, 10 and 11, and the corresponding tables for other diseases, if the second appearance of the disease originated from the first the intermission was disregarded and it was treated as a single outbreak. Also, comparisons of *years* require that outbreaks be counted as closed at the end of the *year;* while in comparing *outbreaks* for testing the value of isolation and disinfection it is necessary to take *complete outbreaks*, even where they extend from one year into the next. This explains the apparent discrepancy between the number of outbreaks here given and the number given at the beginning of this article.

ISOLATION AND DISINFECTION RESTRICTED DIPHTHERIA IN 1894.

Diagram 2.—Diphtheria in Michigan in 1894:- Exhibiting the Average numbers of cases and deaths per outbreak:- in all outbreaks in which Isolation and Disinfection were both Neglected; and in all outbreaks in which both were enforced. (Compiled in the office of the Secretary of the State Board of Health, from reports made by local health officers.)



[PLATE 116]

This diagram graphically represents the lower line of figures in the last four columns of Table 10.

the 15 outbreaks in which Disinfection was enforced and Isolation doubtful; (4) in the 26 outbreaks in which Isolation was enforced and Disinfection was doubtful; (5) in the 31 outbreaks in which Disinfection was enforced and Isolation neglected; (6) in the 10 outbreaks in which Isolation was enforced and Disinfection neglected; (7) in the 56 outbreaks in which Isolation and Disinfection were both neglected; (8) in the 81 outbreaks in which Isolation and Disinfection were both enforced.

	(1) All outbreaks. (420 outbreaks.*)		(2) Isolation or Disinfection or both not mentioned, or statements doubtful. (202 outbreaks.)		(3) Disinfection enforced—Isolation doubtful. (13 outbreaks.)		(4) Isolation enforced—Disinfection doubtful. (26 outbreaks.)		(5) Disinfection enforced—Isolation neglected. (31 outbreaks.)		(6) Isolation enforced—Disinfection neglected. (10 outbreaks.)		(7) Isolation and Disinfection both neglected. (56 outbreaks.)		(8) Isolation and Disinfection both enforced. (81 outbreaks.)	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals....	2,262	404	986	174	57	13	75	12	213	46	17	2	723	122	176	37
Averages..	5.39	.96	4.88	.86	4.38	.92	2.88	.46	6.87	1.48	1.70	.20	† 12.18	† 2.18	† 2.17	† .46

* These do not include the cases and deaths in Detroit, Grand Rapids, Bay City, Saginaw East, Saginaw West, Kalamazoo, Lansing, Port Huron and Menominee, because of the difficulty in determining the beginning and ending of an outbreak in these cities, in which the disease was present in some part of the city nearly all the year. See foot-note on page 215.

† These figures are graphically represented in the diagram opposite *this* page.

TABLE 11.—*Exhibiting for the eight years, and for each of the eight years 1887-94, the numbers of Reported Outbreaks, Cases and Deaths; also for this eight-year Period, the average number of Cases and Deaths per Outbreak in all outbreaks; in those Outbreaks in which Isolation or Disinfection was Doubtful; in which both Isolation and Disinfection were Neglected; in which both Isolation and Disinfection were Enforced; and also the Numbers of Cases and Deaths Indicated to have been prevented by Isolation and Disinfection.*

Years.	All Outbreaks.*			Isolation or Disinfection, or both, not Mentioned, or Statements Doubtful.			Isolation and Disinfection both Neglected.			Isolation and Disinfection both Enforced.			Indicated Saving of Cases and Lives by Isolation and Disinfection.	
	Out-breaks.	Cases.	Deaths.	Out-breaks.	Cases.	Deaths.	Out-breaks.	Cases.	Deaths.	Out-breaks.	Cases.	Deaths.	Cases.	Deaths.
1887	398	2,321	561	202	732	190	60	823	195	78	193	51	† 3,132	† 733
1888	311	1,529	324	199	810	189	34	527	81	58	101	31	2,293	416
1889	376	1,986	418	254	1,314	280	41	478	108	63	98	14	2,398	570
1890	439	2,713	619	291	1,649	401	71	902	169	46	70	15	2,862	426
1891	582	2,965	643	366	1,777	389	79	944	194	70	157	38	3,892	666
1892	525	3,485	740	323	2,341	456	53	657	147	49	105	24	3,146	746
1893	536	3,133	746	309	1,681	362	74	1,020	282	65	159	45	4,253	1,296
1894	420	2,262	404	202	986	174	56	788	122	81	176	37	3,274	513
Totals for the 8 years, 1887-94	3,537	20,394	4,455	2,140	11,290	2,441	467	6,088	1,298	510	1,064	250	{‡25,749 ‡25,728	‡5,365 ‡5,378}
Averages for the 8 years, 1887-94	442	2,549	557	268	1,411	305	58	761	162	64	133	31	3,219	671
Average cases and deaths per outbreak for the 8 years, 1887-94		5.77	1.26		5.28	1.14		13.04	2.78		2.09	.49		

* These do not include the cases and deaths in Detroit, Grand Rapids, Bay City, Saginaw East, Saginaw West, Kalamazoo, Lansing, Port Huron and Menominee, because of the difficulty in determining the beginning and ending of an outbreak in these cities, in which the disease was present in some part of the city nearly all the year. See foot-note on page 215. † The numbers of cases and deaths in this double column are found by multiplying "All Outbreaks" for each year by the average number of cases or deaths per outbreak in those outbreaks in which "Isolation and Disinfection both were neglected," for that year, and deducting from the result thus obtained, the cases or deaths, as the case may be, which were *reported* to have occurred that year. ‡ The two sets of numbers appearing in this column are based on two distinct methods of solution which are explained as follows:—(1) the 25,749 cases and 5,365 deaths are totals of the columns representing cases and deaths saved as explained in the † foot-note, (2) the 25,728 cases and 5,378 deaths are obtained by multiplying the average numbers of cases and deaths per outbreak for the eight years, 1887-94, (13.04 and 2.78, where isolation and disinfection were neglected) by the total number of outbreaks to find the numbers which would have occurred if all outbreaks had been neglected, and subtracting therefrom the numbers of cases and deaths that were reported as having occurred during the eight-year period.

TABLE 12.—*Exhibiting the reported Period of Incubation, stated in days, in 110 cases of Diphtheria. Compiled from reports of Health Officers in Michigan, for the year, 1894.*

Incubation period—Days.	2	3	4	5	6	7	8	9	10	11	12	14	15	16	20	22	24	28	29	32
Cases in each period...	2	1	*7	†7	‡7	§24	¶6	‖12	**7	1	††2	‡‡16	2	3	1	1	§§1	¶¶3	1	1

* In 2 of these cases it was reported as *about* 4 days.
† In 5 of these cases it was reported as *about* 5 days.
‡ In 2 of these cases it was reported as *about* 6 days.
§ In 18 of these cases it was reported as *about* 7 days.
¶ In 2 of these cases it was reported as *about* 8 days.
‖ In 5 of these cases it was reported as *about* 9 days.
** In 5 of these cases it was reported as *about* 10 days.
†† In 1 of these cases it was reported as *about* 13 days.
‡‡ In 6 of these cases it was reported as *about* 14 days.
§§ In 1 of these cases it was reported as *about* 24 days.
¶¶ In 1 of these cases it was reported as *about* 28 days.

The average period of incubation of diphtheria in the 110 cases is 11 days.

TABLE 13.—*Exhibiting, relative to Diphtheria in Fifty-one Instances in Michigan in 1894, the Reported Period of Incubation, within certain Limits, stated in Days; also the Means, the Average of which may Represent the Average Period of Incubation.*

In ten Instances.		In ten Instances.		In eleven Instances.		In ten Instances.		In ten Instances.	
Days.	Means.	Days.	Means.	Days.	Means.	Days.	Means.	Days.	Means.
2-3	2.5	3-4	3.5	3-7	5.0	4-7	5.5	6-8	7.0
2-3	2.5	3-4	3.5	3-8	5.5	4-10	7.0	6-12	9.0
2-3	2.5	3-4	3.5	3-10	6.5	5-7	6.0	7-10	8.5
2-3	2.5	3-4	3.5	3-11	7.0	5-7	6.0	7-14	10.5
2-3	2.5	3-5	4.0	3-11	7.0	5-9	7.0	7-21	14.0
2-4	3.0	3-5	4.0	3-14	8.5	5-10	7.5	7-28	17.5
2-7	4.5	3-5	4.0	3-21	12.0	5-10	7.5	8-10	9.0
2-10	6.0	3-5	4.0	4-5	4.5	5-15	10.0	8-12	10.0
2-12	7.0	3-6	4.5	4-5	4.5	6-7	6.5	10-12	11.0
2-21	11.5	3-7	5.0	4-6	5.0	6-8	7.0	10-14	12.0
.....				4-7	5.5				

The average of all means, for the 51 instances, is 6.5 days.

AGES OF GREATEST PREVALENCE OF, AND MORTALITY FROM, DIPHTHERIA.

In Table 14 are shown the numbers of cases and deaths from diphtheria in Michigan in 1894, in which the ages were stated in the health officers' reports. In this table the cases and deaths are arranged in *age-groups*, showing what per cent the cases in each group were of all cases; the per cent that the deaths in each group were of all deaths; the per cent the deaths in each group were of the cases in that group, and the per cent the deaths in special groups were of all deaths.

Table 15 gives the percentages that the cases and deaths which occurred in certain age-groups were of all cases and deaths where the ages were

TABLE 16.—*Exhibiting, by Sex, for each year of Age, and in certain Age-groups, the numbers of persons who died from Diphtheria during the year 1894, and the per cent the deaths in each Age-group were of deaths at all ages. (Compiled from such reports to the State Board of Health, as stated the sex and age.)*

Sex.	Ages in Years, and groups of Years.	All ages known.	Number and per cent of Deaths by Sex, in certain Age-periods.*																						
			0-5.					5-10.					10-15.					15-20.					20-25.	25-30.	30 and over.
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
Males.	No. of Deaths, by single Years.	180	7	15	16	12	20	17	17	12	9	15	5	8	8	4	1	2	2	3	1	2	2	0	2
	No. of Deaths, by Groups of Years	----	70					70					26					10					2	0	2
	Per cent the Deaths in each age-group were of the total deaths among Males	100	38 8					38.8					14.4					5.6					1.1	0	1.1
	Average age at Death, from Diphtheria	7.8																							
Females.	No. of Deaths, by single Years.	232	12	7	21	21	16	28	15	15	12	12	7	13	8	9	2	6	3	2	2	2	5	7	7
	No. of Deaths, by Groups of Years	----	77					82					39					15					5	7	7
	Per cent the Deaths in each age-group were of the total deaths among Females	100	33.2					35.3					16.8					6.9					2.1	3	3
	Average age at Death, from Diphtheria	9.8																							
Both Sexes.	No. of Deaths, by single Years.	412	19	22	37	33	36	45	32	27	21	27	12	21	16	13	3	8	5	5	3	4	7	7	9
	No. of Deaths, by Groups of Years	----	147					152					65					25					7	7	9
	Per ct. the Deaths in each age-group were of the total deaths from diphtheria in both sexes.	100	35.7					36.9					15.8					6.1					1.7	1.7	2.2
	Average age at Death, from Diphtheria	8.9																							

* Method of grouping is stated on page 220.

TABLE 17.—*Exhibiting, by Sex, the per cent of persons in certain Age-groups who recovered from Diphtheria, in Michigan, during the year 1894; also the average age and the numbers of cases included. (Compiled from such reports as stated the ages.)*

Year.	Sex.	Average age of persons who recovered. Years.	No. of cases included.	Age, in Periods of Years, Per Cent of (non-fatal) Cases in each Period.*													
				All Ages.	5 years and under.	5 to 10.	10 to 15.	15 to 20.	20 to 25.	25 to 30.	30 to 35.	35 to 40.	40 to 45.	45 to 50.	50 to 55.	55 to 60.	60 years and over.
1894.	Males.....	11.9	788	100	22	34	20	10	5	3	2	2	1	.25	.25	0	0
	Females..	14.8	978	100	19	27	21	12	6	5	4	3	2	1.3	0.4	.2	0.3

* Method of grouping is stated on page 220.

TABLE 18.—*Exhibiting, by Sex, and in certain Age-groups, the per cent of persons who died from Diphtheria in Michigan, during the 3 years and each of the 3 years, 1892-94; also the average age at death, and the number of deaths included. (Compiled from such reports as stated the ages.)*

Deaths from Diphtheria.											
Year.	Sex.	Average age, Years.	No. of Deaths included.	Ages,—In Periods of Years. Per Cent of Deaths in each Period of Age.*							
				All ages.	0 to 5.	5 to 10.	10 to 15.	15 to 20.	20 to 25.	25 to 30.	30 Years and over.
1892.	Males	7.1	231	100	46	32	16	4	1	1	
	Females.....	8.7	240	100	41	31	15	5	2	3	2
1893.	Males	8.1	207	100	43	34	9	10	3	1	1
	Females.....	8.8	228	100	34	37	17	5	2	3	1
1894.	Males	7.8	180	100	39	39	14	6	1	0	1
	Females.....	9.8	232	100	33	35	17	7	2	3	2
1892-94.	Males	7.7	618	100	43	35	13	7	2	1	1
	Females.....	9.1	700	100	39	34	16	6	2	3	2

* Method of grouping is stated on page 220.

Table 18 gives a summary of the material contained in Table 16, and of similar tables made for previous years. The combined material for the three years (1892-94) is also in Table 16. The average age at death from diphtheria in these years was, for males, 7.7, for females, 9.1 years.

There were 82 more deaths of females than of males during the three years.

AVERAGE DURATION OF DIPHTHERIA.—FATAL AND NON-FATAL CASES.

Fatal Cases.

TABLE 19.—*Exhibiting, by sex of patient, the duration (in days) of fatal cases of sickness from Diphtheria, in Michigan, during the year 1894. Arranged in five-day groups. (Compiled from those reports which stated the length of time the patient was sick.)*

Fatal cases of Diphtheria.											
Year.	Sex.	No. of cases included.	Duration of Sickness:—Per cent of Deaths in each Period of Days.								
			All cases.	0 to 5 days.	5 to 10.	10 to 15.	15 to 20.	20 to 25.	25 to 30.	30 to 35.	35 and over.
1893.	Males	192	100	35	43	13	5	2	1	0	0
	Females	203	100	38	36	15	6	3	1	.5	0
1894.	Males	131	100	39	37	13	5	1	0	2	3
	Females	167	100	29	36	20	7	2	2		4

From Table 19, it may be seen that of the 131 males who were reported to have died from diphtheria in 1894, and of which the interval between the day of being taken sick and the day of death was given, the largest per cent died in the period including the first 5 days of sickness; and the next highest per cent died in the period of the second 5 days; while with 167 females reported as having died in the same time, the largest per cent died in the period of the second 5 days, and the next highest per cent in the period of the first 5 days.

Seventy-six per cent of the males and 65 per cent of females died before the 11th day of sickness.

The average duration of the fatal cases, in 1894, was between 9 and 10 days, alike for males and females.

Non-Fatal Cases.

TABLE 20.—*Exhibiting by Sex of patient, the Duration (in days) of Non-Fatal cases of sickness from Diphtheria, in Michigan, during the year 1894. Arranged in five-day groups. (Compiled from those reports which stated the length of time the patient was sick.)*

Non-Fatal Cases of Diphtheria.											
Year.	Sex.	No. of cases included.	Duration of Sickness:—Per Cent of Cases in each Period of Days.								
			All Periods.	0 to 5.	5 to 10.	10 to 15.	15 to 20.	20 to 25.	25 to 30.	30 to 35.	35 days and over.
1893.	Males	442	100	9	35	25	14	9	4	2	2
	Females	517	100	8	37	27	12	8	4	2	2
1894.	Males	503	100	8	31	23	20	9	6	1	2
	Females	606	100	9	30	20	20	12	4	2	3

In Table 20 it may be seen that in non-fatal cases of diphtheria for the year 1894, the duration of sickness in five-day periods was nearly the same in both sexes; that 62 per cent of the males and 59 per cent of the females recovered before the 16th day of sickness.

The average duration was between 9 and 10 days for males and females alike.

Diphtheria in Detroit and Grand Rapids in 1894.

During the year ending December 31, 1894, there were reported 881 cases of diphtheria with 209 deaths from that disease, in the city of Detroit. This shows an increase of 242 cases and of 26 deaths from diphtheria, as compared with the numbers reported from that city for the preceding year. Twenty-nine per cent of the cases proved fatal in 1893, while only 24 per cent of the reported cases proved fatal in 1894.

The sickness-rate from diphtheria in the city of Detroit, in the year 1894, was 37.04 cases per 10,000 of population; the death-rate from the same disease was 8.79. It is interesting to contrast these high sickness and death-rates in Detroit with the very low rates in the city of Grand Rapids, where the sickness-rate from diphtheria was 12.21 cases per 10,000 of population, and the death-rate was 2.14.

The sickness-rate for the State in the year 1894 was 17.19 cases of diphtheria per 10,000 of population; the death-rate from the same disease was 3.32. It will be seen by comparison that the rates in Detroit were much higher than the rates for the whole State, while the sickness and death-rates for Grand Rapids were much lower than the averages for the State.

In 1894 the source of contagium of diphtheria outbreaks was reported as being from Detroit, by health officers in 6 outside jurisdictions; in two other instances the health officers reported the source as "probably" from Detroit. The Map "Movements of Contagium of Diphtheria", page —, shows the localities thus reported. Lines connecting outside localities with Detroit indicate the movements of infection.

In only one instance was the source of contagium reported as being from Grand Rapids, during the year 1894.

Transportation of a case of Diphtheria from the city of Wyandotte, to the city of Detroit.

December 20, 1894, N. W. Webber, M. D., acting health officer of the city of Detroit wrote to the Secretary of this Board, relative to the transportation of a case of diphtheria from the city of Wyandotte to the city of Detroit, Dr. Webber's letter was as follows:—

"Dr. Henry of this city reported a case of diphtheria at 53, 33rd St., at 10:10 A. M., name F. K., aged 2½ years. He stated that he saw the case late last P. M., and, when he called this morning found the child dead. Our placarder who placarded the house, informs me that the mother of the deceased child stated to him that 'she and the child were visiting at Wyandotte, Michigan, and that last Tuesday, Dec. 18th, Dr. Cahalan, of that place, attended the child and pronounced it as having diphtheria.' She further states that by consent of this doctor she left Wyandotte and drove to Detroit Wednesday (yesterday) with the result as above stated.

"Detroit has about all the diphtheria it cares to have at present, and if these are facts as stated to me, I think something should be done to prevent the importation of additional cases into this city."

Dec. 22, 1894, the Secretary of this Board sent the following reply to the above-quoted letter from Dr. Webber:—

"Accept thanks for your letter of Dec. 20, relative to the case of diphtheria which was brought to your city from Wyandotte. I will write at once to Dr. Cahalan, and also to Dr. N. T. Langlois, the health officer of Wyandotte, relative to the subject. It may be that Dr. Langlois was not aware of the fact that the child was removed to your city. If Dr. Cahalan gave permission for the removal of the child of course he did wrong, and had no authority to give such permission."

On the same day that the above letter was sent from this office to Dr. Webber of Detroit, the following letters were sent to Dr. James Cahalan of Wyandotte and to Dr. N. T. Langlois, health officer of that city.

Letter to Dr. Cahalan:—

"I am in receipt of information from the city of Detroit to the effect that a child named 'Fred Keahl, aged 2½ years,' was brought to that city from Wyandotte while sick with diphtheria, on Dec. 19, and that it was found dead by the authorities on the morning of Dec. 20.

"The mother of the child is alleged to have stated that 'she and the child were visiting at Wyandotte, Mich., and that last Tuesday, Dec. 18, Dr. Cahalan of that place attended the child and pronounced it as having diphtheria.' She further states that by consent of this doctor she left Wyandotte and drove to Detroit Wednesday, with the result above stated.

"Will you have the kindness to give me the particulars relative to the subject. Was the case reported to the health officer of Wyandotte? and did he know that the child had been removed to Detroit?"

The letter to Dr. Langlois was similar to the above-quoted one to Dr. Cahalan, with the following addition:—

"I would be pleased to learn whether you knew of the child's illness while it was in your jurisdiction. Did Dr. Cahalan report the case to you? If so, did you give your permission for the removal of the child to Detroit?

"I would be pleased to learn all the particulars relative to the subject."

The following letter dated Dec. 24 was received from Dr. Cahalan:—

"On the 18th of December I was called to the house of Herman Schultz, to attend to Mrs. K.'s child, who on examination was found to be very sick with diphtheria. The mother of the child expressed great desire to get back to her home in Detroit, when she found out the nature of the disease. I told her on no condition could she leave the house without the permission of the health officer. I reported the case to the health officer in about five minutes after I saw it. Next morning I saw the child again, and told the mother that her child would die. I went back to the health officer again, and told him that Mrs. K. was determined to go home. That was the last I heard of the case until I received your communication."

The following letter dated Dec. 24, 1894, was received from Dr. Langlois:—

"My attention was called to a letter written by you to Dr. Cahalan of this city pertaining to a case of diphtheria found dead in the city of Detroit. To make things plain to you I will explain. The child which died and its mother were visiting in this city at a relative's. About two days after arriving here the child was taken sick with diphtheria, and reported to me. I ordered the house placarded, and enclosed you will find my final report of case. In the meantime I heard from them that they wanted to go home on the first train to Detroit. I immediately went and saw the parents; forbid them from going home by train or street car and cautioned them as to the danger and contagiousness of the case. The family where they were visiting have five young children, liable to contagion, they begged of me to let them go home. After thinking the case over and taking into consideration the other young children, I decided to let them move the child in a carriage, with the caution to go directly home without stopping at any place. It was about seven miles from starting point. I then sent a notice to the Detroit health officer that diphtheria was at the house of these people, designating street and number. The Detroit authorities probably had not received my notice at the time you received notice from them. As far as moving the patient—I used the best of my judgment whether to leave this whole family liable to the disease or move patient to its own home, where it could be isolated.

"P. S. Have just received your letter."

December 26, the Secretary of this Board wrote, in answer to the above-quoted letter from Dr. Langlois, as follows:—

"Accept thanks for your letter of Dec. 24, and for your weekly report on blank 'M' for the week ending Dec. 22, relative to Diphtheria.

"Relative to the removal of the child, which was sick with diphtheria, to Detroit. Instead of notifying the health officer of that city that such removal was taking place, you should first have obtained his permission to remove the sick child to his jurisdiction. The child and all infected persons should have been isolated within your jurisdiction. I understand your position, I think, but the alternative you mention was not the only one, because there should have been provided by your board of health a hospital tent or some way whereby the well children should have been separated from the sick.

"What was done in way of disinfection of the carriage, blankets, driver of carriage, who took the child to Detroit? If the carriage and robes and blankets have not been disinfected, such disinfection should be done without delay.

"It is a question whether you and all others concerned in the movement may not be liable to prosecution under Act 15, laws of 1891. This is mentioned in order that *next time* you may have all sides of the question before you."

ERRATUM:

The map on page 178 was constructed not in accordance with the compiler's plan; by mistake the clerk made it exhibit the reported cases and deaths, and not the death-rate as he should have done. Therefore, the comments on the map, on page 176, should be slightly changed.

SCARLET FEVER IN MICHIGAN—YEAR ENDING DECEMBER 31, 1894.

During the year ending December 31, 1894, there were reported to the Secretary of the State Board of Health, 678 outbreaks of scarlet fever in 547 localities in Michigan, which resulted in 5,500 cases and 203 deaths. Notwithstanding the marked improvement which has occurred both in promptness and accuracy of reports of local health officials to the central office, it is probable that not all cases of and deaths from scarlet fever are yet reported. For the year 1894 there were reported to the Secretary of State 163 deaths from scarlet fever, 40 less than were reported to this office; and the Secretary of the State Board of Health estimates that the deaths reported to the Secretary of State should be increased by about 40 per cent to equal the actual number of deaths which occur. According to this estimate, there were about 228 deaths from scarlet fever during 1894, in Michigan, instead of 203, as reported to the State Board of Health.

Some of the purposes of this compilation are stated on page 152 of this Annual Report.

DISTRIBUTION OF SCARLET FEVER IN 1894.

The following Tables, 1 and 2, and accompanying map, exhibit, in different ways, the distribution of the reported scarlet fever in Michigan, in 1894. Table 1 shows that the sickness-rate from this disease, for the year, for the whole State, was 24.54 cases per 10,000 inhabitants; and that the death-rate per same number of inhabitants, was .91 of one death. Table 1, also shows that the greatest reported sickness-rate from this disease, in 1894, was in Montmorency county, where the ratio of cases to population was 123.20 to 10,000. Other counties where the reported sickness-rates were largely in excess of the average for the State, were:—Alger, 79.48; Isabella, 76.02; St. Joseph, 70.95; St. Clair, 70.14; Marquette, 61.57; Genesee, 60.17; Alpena, 57.01, cases per 10,000 inhabitants. The lowest reported sickness-rate for the year, .72 of one case per 10,000 inhabitants, was in Cheboygan county. In 27 other counties the sickness-rates were less than one-half the average for the State. Of these counties, Presque Isle, 1.69; Gladwin, 2.04; Otsego, 2.09; Sanilac, 2.95; Kalkaska, 3.55; Crawford, 3.69; Iron, 3.78, cases per 10,000 inhabitants, ranked lowest. The greatest death-rate from this disease during the year, 11.09 cases per 10,000 inhabitants, was in Oscoda county. In 19 other counties the death-rates were more than double the average death-rate for the State. Of these counties, Alger, 7.22; Lake, 6.79; Gogebic, 5.68; Wexford, 4.98; Montmorency, 4.11; Crawford, 3.69; Marquette and Mecosta, each, 2.89; Missaukee, 2.88, ranked highest. The lowest death-rate, .24 of one death per 10,000 inhabitants, was in Kalamazoo county. Other counties where the death-rates were far below the average death-rate for the State, were:—Allegan and Ottawa, each, .26; Tuscola, .29; Huron, .31; Hillsdale, .33; Calhoun, .42, of one death per 10,000 of population. From the following 7 counties: Baraga, Grand Traverse, Keweenaw, Luce, Manitou

Ontonagon and Roscommon,—having an aggregate population of 36,345—no scarlet fever was reported during the year.

The fatality from scarlet fever in 1894,—i. e., the proportion of reported cases which have proved fatal, was, for the whole State, 3.7 per cent, or about one death to 27.1 cases. In Crawford county there was but one (fatal) case reported, and in Oscoda county, two (fatal) cases. Other counties where the fatality was considerably greater than the average fatality for the State, were:—Gogebic, 21.6; Leelanaw, 20; Lake, 17.4; Newaygo, 13.3; Wexford, 13; Iosco, 12.5; Berrien, 11.5 per cent of reported cases. From twenty-six counties, where an aggregate of 701 cases of scarlet fever occurred, no deaths were reported. The minimum fatality-rate in counties from which deaths were reported, .7 of one per cent of reported cases, occurred in Kalamazoo county. Other counties where the fatality was considerably less than the average fatality for the State, were: Benzie, 1; Shiawassee, 1.8; St. Clair, 1.3; Lapeer, 1.6, per cent of reported cases.

The Map which follows Table 1, shows for each county of the State the number of cases and deaths reported from scarlet fever, the number of localities where the disease was present during the year, and the number of outbreaks which occurred in those localities, in 1894. The map enables the reader to see the locations of the several counties

Table 2 exhibits the latitudinal distribution of scarlet fever throughout the State, by tiers of counties; all the counties of the Upper Peninsula considered as one tier. By this table (2), it appears that the lowest sickness-rate from scarlet fever (7.37 per 10,000 of population) was in the eleventh tier of counties; and that the seventh, eighth and fifth tiers of counties were next in lowest sickness-rates, they being, respectively, 11.16, 16.33 and 16.53 per 10,000 of population. The tier of counties having the greatest sickness-rate (39.91 per 10,000 of population) was the fourth tier; and the sixth tier with 30.84, and the tenth tier with 30.58 per 10,000 of population were the next in highest sickness-rates.

The sickness-rate in the second tier of counties, as may be seen in the table, was 18.05 cases per 10,000 inhabitants. In the city of Detroit, situated in this tier, the rate was 15.35 per 10,000, and in this tier excluding Detroit, the rate was 20.47 per 10,000. In the fourth tier of counties, in which is situated the city of Grand Rapids, the sickness-rate was 39.91 per 10,000 inhabitants. In the city of Grand Rapids the rate was 20.02, and in the tier of counties excluding Grand Rapids it was 45.18 cases per 10,000 inhabitants. It is thus shown that in 1894 the sickness-rates from scarlet fever in Detroit and Grand Rapids are lower than those for the tiers of counties in which they are situated, and lower than the average for the whole State. The experience of several previous years has shown the reverse of this, the rates in these cities having in those years been much higher than in their tiers of counties, and in the State.

TABLE 2.—*Exhibiting the Population of Michigan for the year 1894, by tiers of counties (Upper Peninsula as one tier); also the number of cases of Scarlet Fever* REPORTED *from each of these divisions for 1894, and the number of cases per 10,000 population of each division.*

Counties in Groups, most Northern ones First.					Population, 1894.*	Reported Cases of Scarlet Fever, 1894.	Reported Cases per 10,000 of Population.
State					2,241,454	5,500	24.54
Upper Peninsula	Alger. Delta. Schoolcraft. Luce.	Mackinac. Chippewa. Keweenaw.	Houghton. Ontonagon. Gogebic. Baraga.	Marquette. Iron. Menominee. Dickinson.	206,572	603	29.19
Eleventh tier of counties	Manitou. Emmet. Charlevoix.	Cheboygan. Presque Isle.			42,085	31	7.37
Tenth tier of counties	Leelenaw. Antrim. Otsego. Montmorency.	Alpena.			46,766	143	30.58
Ninth tier of counties	Benzie. G'd Traverse. Kalkaska.	Crawford. Oscoda. Alcona.			41,136	122	29.66
Eighth tier of counties	Manistee. Wexford. Missaukee. Roscommon.	Ogemaw. Iosco.			66,747	109	16.33
Seventh tier of counties	Mason. Lake. Osceola. Clare.	Gladwin. Bay. Huron. Arenac.			154,145	172	11.16
Sixth tier of counties	Oceana. Newago. Mecosta. Isabella.	Midland.			91,113	281	30.84
Fifth tier of counties	Muskegon. Montcalm. Gratiot. Saginaw.	Tuscola. Sanilac.			250,444	414	16.53
Fourth tier of counties	Ottawa. Kent. Ionia. Clinton.	Shiawassee. Genesee. Lapeer. St. Clair.			378,642	1,511	39.91
Third tier of counties	Allegan. Barry. Eaton. Ingham.	Livingston. Oakland. Macomb.			230,670	540	23.41
Second tier of counties	Van Buren. Kalamazoo. Calhoun. Jackson.	Washtenaw. Wayne.			503,098	908	18.05
First tier of counties	Berrien. Cass. St. Joseph. Branch.	Hillsdale. Lenawee. Monroe.			280,086	666	23.95

* Population taken from the State Census of 1894.

SCARLET FEVER IN 1894, COMPARED WITH PREVIOUS YEARS.

From year to year there has been a steady improvement, both in the methods adopted by the State Board of Health in securing and compiling reports, and in the efforts made by local health authorities throughout the State to furnish in their reports the information desired by the State Board. These facts, together with the constantly increasing population, make it difficult to determine the exact increase or decrease of prevalence of the disease in the State by comparison of the numbers of outbreaks of the disease, and the cases and deaths resulting therefrom; and

these facts should be borne in mind in referring to Table 3. While these facts might reasonably be expected to produce a constant increase in the reported prevalence of the disease, Table 3 shows that such increase has not occurred in the last two years. For although in those years the numbers of reported outbreaks of the disease have slightly *increased* over previous years, the numbers of cases and deaths reported have *decreased;* and the last year (1894) markedly so. Table 3 further shows that the fatality from scarlet fever in 1894 was much less than in 1893 and not much more than half the average fatality for the ten years, 1884–1893.

TABLE 3.—SCARLET FEVER IN MICHIGAN.—*Numbers of Reported Outbreaks, Localities (in which they Occurred), Cases and Deaths; Average Numbers of Cases and Deaths Per Outbreak, and the Per Cent of cases which proved fatal, as reported for each of the 13 Years, 1882–1894; with the departure of the same for 1894 from 1893, and from the Average of the same for the 10 Years, 1884–93.*

Year.	Reported Outbreaks.	Reported Localities.	Reported Cases.	Av. No. of Cases per Outbreak.	Reported Deaths.	Av. No. of Deaths per Outbreak.	Deaths per 100 Cases.
1882		82	849		138		*16.0
1883†	164	150	1,802	11.	248	1.51	*14.0
1884‡	324	296	2,476	8.	230	.71	9.0
1885	356	337	2,750	8.	187	.53	7.0
1886	366	302	3,046	8.28	275	.71	9.0
1887	358	297	3,400	9.63	314	.89	9.0
1888	381	315	2,989	7.85	200	.52	6.7
1889	421	382	3,535	8.40	166	.39	4 6
1890	481	417	3,835	7.97	163	.34	4.2
1891	605	516	6,212	10.27	286	.47	4.6
1892	625	548	7,075	11.32	487	.78	6.9
1893	675	566	6,065	8.99	415	.61	6.8
1894	678	547	5,500	8.11	203	.30	3.7
Average for ten years, 1884–1893	461	398	4,133	8.87	272	.60	6.8
Departure of 1894 from 1893	+ 3	— 19	— 565	— .88	—212	— .31	—3.1
Departure of 1894 from the average for 10 years, 1884–93	+217	+149	+1,362	— .76	— 69	— .30	—3.1

* Probably in some instances only the fatal cases were reported.
† Use of the blank form "M" for weekly reports was begun in May, 1883.
‡ Use of the annual reports of health officers in compiling scarlet fever for the communicable disease article was begun in 1884.

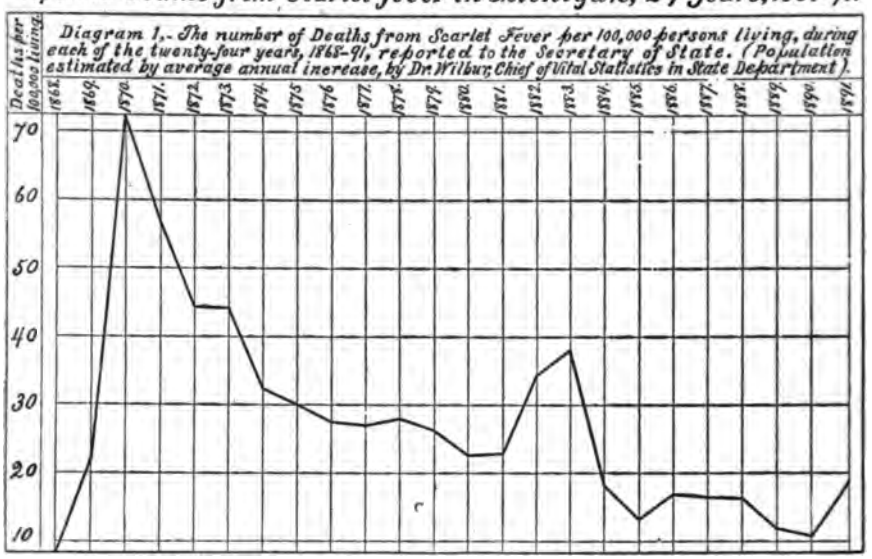
Table 4, exhibiting the number of deaths from scarlet fever, per 100,000 persons living, reported to the Secretary of State, probably more accurately represents the annual fluctuations than the total death-rate from scarlet fever in Michigan during the 27 years, 1868–94. The diagram (No. 1) printed below graphically represents the same data, with the exception of those for the years 1892, 1893 and 1894.

TABLE 4.—*Exhibiting the death-rate from Scarlet Fever reported in Michigan, per 100,000 of population, for each of the 27 years, 1868-94. (The data for this table were supplied by C. L. Wilbur, M. D., Chief of Vital Statistics of Michigan, Department of the Secretary of State.)*

Year.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.
Death rate.....	8.48	22.09	71.96	56.62	44.33	43.94	32.23	29.99	27.41	26.91	27.74	26.26	22.66

Year.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	18.2.	1893.	1894.
Death rate.....	22.82	34.25	37.94	17.91	13.13	16.69	16.25	16.13	11.72	10.60	12.70	20.23	16.90	7.27

Reported Deaths from Scarlet fever in Michigan, 24 Years, 1868-91.



[Plate No. 676.]

SCARLET FEVER IN EACH MONTH OF THE YEAR, 1894.

TABLE 5.—*Exhibiting the reported number of outbreaks of Scarlet Fever which Began, the number which Ended, and the number of outbreaks which were Present, in each Month of the Year 1894, in the different local jurisdictions of Michigan.*

Outbreaks.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Number began.....	110	59	53	55	43	39	29	38	34	53	61	61	635
Number ended.....	8	33	42	41	50	38	35	29	22	31	41	101	476
Number present....	116	150	154	162	153	136	121	117	113	139	166	177	

The last line of figures in Table 5, representing the reported number of outbreaks present, is not derived from the preceding two lines, as might be supposed, but is obtained by actual count of the number of outbreaks reported as existing in each month. Frequently the beginning of an outbreak is reported but the end of the outbreak is not reported; and sometimes the month in which the outbreak ended is given without giving the date of the beginning of the outbreak. In either case the outbreak may have begun and ended in the same month, or it may have extended through several months. There were 159 more beginnings than endings of outbreaks reported during the year 1894.

TABLE 6.—*Exhibiting the Number and Per Cent of Cases of Scarlet Fever in Michigan in each Month during the Year 1894. (Includes each case for which the time during which it existed, was stated in the reports. Each of such cases is counted in each month in which, or part of which, the case was reported to have existed.)*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Number of cases sick in any part of the month	385	502	488	492	518	496	311	275	347	474	545	592
Per cent the cases sick in each month were of total reported cases	7	9	9	9	9	9	6	5	6	9	10	11

The first line of figures, in Table 6, shows the number of cases reported sick in any part of each month.

As some of the cases were sick longer than one month they are included in the cases sick in more than one month, therefore the sum of the cases sick in all the months exceeds the total of reported cases in 1894; and the sum of the last line of figures in Table 6 exceeds 100.

The last line of figures, in this table, shows the per cent the cases sick in each month are of the exact number of cases *reported* to this office for the year 1894.

TABLE 7.—*Reported Source of Contagium of Cases of Scarlet Fever in 1894.*

	Cases.
Traced to a former case	1,261
Probably traced to a former case	302
Infected houses, articles, clothing, etc	15
Alleged unsanitary conditions	8
Unknown, or reports not definite (including "Exposure", "Contagium", "Endemic" and "Sporadic")	2,427
Not reported	1,487
All cases	5,500

SOURCE OF CONTAGIUM OF SCARLET FEVER, HOW THE DISEASE IS SPREAD, AND THE VITALITY OF THE CONTAGIUM.

Of the 5,500 cases of scarlet fever reported during the year 1894, as exhibited in the preceding table, the local health officers reported the source of contagium as follows:—Traced to a former case, 1,261; probably traced to a former case, 302; traced to infected houses, articles, clothing, etc., 15; attributed to unsanitary conditions, 8; unknown or reports not definite, 2,427; not reported, 1,487.

Cases of Scarlet Fever Traced to a Former Case.

Table 7 shows that of the 5,500 reported cases of scarlet fever in this State in 1894, 1,261 were reported traced to a former case of the disease. The following extracts are from a few of the health officers' reports in which the cases were traced to a former case in the same jurisdiction; and further on in this article are extracts from health officers' reports in which cases of the disease were traced to some definite outside jurisdiction.

"A child visited where there was a case of scarlet fever, and then was taken sick with scarlet fever in the school room."—*Fred Shillito, M. D., Marcellus village, Cass county.*

"From previous cases."—*J. W. Hawkey, M. D., Littlefield township, Emmet county.*

"Previous cases not reported to health officer."—*F. H. Callow, M. D., Genesee township, Genesee county.*

"From the public school."—*Geo. D. Slocum, M. D., Bessemer city, Gogebic county.*

"One from his sister, two, can't determine."—*A. C. Manley, M. D., Leslie township, Ingham county.*

"One family, I learn, had scarlet fever light, kept it secret."—*H. M. Barber, Waterloo township, Jackson county.*

"The patient contracted the disease from his young child who had a mild form of the disease, but no medical attendance."—*W. S. Worden, M. D., Macon township, Lenawee county.*

"A mild case which had no physician spread the disease to all cases reported, as near as we can trace the cause of spreading as it did."—*Wm. Hyndman, M. D., Woodstock township, Lenawee county.*

"Visiting family where they had scarlet fever in a mild form and did not know what it was."—*Lewis P. May, M. D., Chesterfield township, Macomb county.*

"All cases so far, five, were attending four departments of the third ward school, and can trace contagion from the Snell family that had the public funeral, reported the first of this month."—*W. E. Dockry, M. D., Big Rapids city, Mecosta county.*

"From previous outbreak."—*N. H. Traver, M. D., Albert township, Montmorency county.*

"The disease has been in the village in a mild form since two years ago this present fall. These cases, no doubt, were due to direct contagium."—*R. C. Hepburn, M. D., Evart village, Osceola county.*

"First case taken sick had no doctor, and second case contracted from the first, but could get no trace of the first contagium."—*F. S. Love, M. D., Vernon township, Shiawassee county.*

"Four in the family had the fever in a very mild form, being on the street a part of the time, communicated it to the fourteen."—*W. A. Davis, M. D., Grand Ledge city, Eaton county.*

"The disease was spread by a family going to an infected house after they were notified to keep away and notices put up."—*C. E. Nelthorpe, M. D., Sherwood township, Branch county.*

"It was so mild I did not insist upon a rigid isolation. The well persons attended school, except for one week. Spread from school to all the others, except No. 10, which was by a visit from a neighbor."—*P. Fleming, Dexter township, Washtenaw county.*

"The class of people among whom the first cases occurred are densely ignorant and habitually mingle with each other regardless of diseases. One mother attended a bowery dance while her child lay sick and which afterwards died."—*H. Holden, M. D., Monguagon township, Wayne county.*

Source of Scarlet Fever Unknown or Reports Indefinite.

The following extracts are taken from a few of the health officers' reports in which the source of contagium of cases was reported as unknown, or reports were not definite.

"A picnic was held at Life Saving Station, and it is believed that one or two children from a distance were there who had been exposed."—*Louis Fleckenstein, M. D., Huron township, Huron county.*

"Could not find out how or where she could have been exposed."—*Cicero M. Stuck, M. D., Plainwell village, Allegan county.*

"Sporadic."—*L. D. Tompkins, M. D., LaGrange township, Cass county.*

"Imported contagion."—*John S. Caulkins, M. D., Dryden township, Lapeer county.*

"So far as we know it occurred in the school. Four families were taken at the same time."—*John Irwin, Harrison township, Macomb county.*

Scarlet Fever Attributed to Unsanitary Conditions.

"Moving into a new damp house."—*Wm. H. Ross, East Grand Rapids village, Kent county.*
"Privy within dwelling."—*John C. Brechtebauer, Carrolton township, Saginaw county.*

Duration of the Vitality of the Scarlet Fever Germ.

The germ of scarlet fever is not yet demonstrated; but that there is a germ seems to be proved by the known communicability of the disease.

The following extracts from the reports of health officers and physicians indicate that the scarlet fever germ frequently retains its vitality for a long time outside of the human body, in an apparently dormant or inactive state, in houses, clothing, carpets, furniture, etc., and is then capable of developing scarlet fever in persons coming into such houses or in contact with or near such articles, thus showing the importance of carefully disinfecting all infected houses and articles, even where they are not to be used for a long time:—

"Two years ago a patient died in the house where this outbreak occurred. There seems to have been no disinfection used after death or during sickness."—*S. Galbreath, Casco township, Allegan county.*

"Probably due to infected clothing from a family who had the disease several months before."—*O. N. Ramsdell, M. D., Bear Creek township, Emmet county.*

"This case undoubtedly came from the child playing with a doll which was used by children sick with scarlet fever two years previous."—*E. C. Varnum, M. D., Jonesville village, Hillsdale county.*

"From wearing infected clothing."—*Otto Frenzel, M. D., Winsor township, Huron county.*

"Some neighbors of the family having the fever presented them with a bedstead and tick which they had been using some five years ago when their family had scarlatina. The bedstead had stood out in the weather for a long time and had been to Wolf lake on a camping expedition, as had the tick. Both had been rained on, etc., for a long time. This family with the disease now do not go any place; nor have they heard of any one having scarlet fever; but they got the bedstead and tick. The father shook it out and filled it in the presence of his little daughter, and in seven days she had scarlet fever. This suggests a quite persistent continuance of the contagium under great exposure for a long time."—*Duncan Hyndman, M. D., Norvell township, Jackson county.*

"Supposed to be brought in the clothes or hair of a man from another township, having the disease in his family, came to the door and talked with the mother, did not enter the house."—*Wm. Hyser, M. D., Plainfield township, Kent county.*

"Some ten years ago three children had the same disease. One died and this family just moved in and were the first and only case."—*A. R. Hicks, M. D., Sand Lake village, Kent county.*

"Without doubt from improper disinfection three years ago. The first case was a little boy whose sister had the disease three years ago, and I have every reason to think he contracted it from playing in a long closed room with articles not disinfected."—*E. B. Patterson, M. D., Michigamme township, Marquette county.*

"From a rag bag, in all probability, that had been packed away from last year's outbreak. The woman had laid it away from a patient who had the disease and had forgotten its existence, until a few days before her sickness when she went to it and got her rags and her fever."—*Alex. McBain, Sr., Riverside township, Missaukee county.*

"From a house in which the disease occurred about two years ago."—*E. A. Chapman, M. D., Commerce township, Oakland county.*

"The mother with her child, the subject, at a neighbor's, was overhauling things in an old trunk where it is believed fomites were shut up six years ago when scarlet fever was in the house."—*Edwin Stewart, M. D., Mendon township, St. Joseph county.*

"Imported by clothing."—*Chas. H. Miller, clerk, Bloomingdale township, Van Buren county.*

"Now, as near as we can learn we got the fever from a bed used some time in the month of Feb., 1894, by a man from Cadillac. He worked for me, and stayed here two nights. They had the fever at his house. We did not use the bed until two weeks before the first child came down, Apr. 26, 1894."—*Warren Holcomb, a resident of Clam Lake township, Wexford county.*

Movements of Contagium of Scarlet Fever.

The following Table (8) and Map, "Movements of Contagium," show the sources and direction of movements of scarlet fever in Michigan, where the contagium was reported by health officers to have been introduced into their jurisdictions from localities outside the State, or from other jurisdictions within the State.

TABLE 8.—*First, second and third localities, where the second locality was infected with Scarlet Fever from the first, and the third was infected from the second; and the numbers of cases and deaths from Scarlet Fever in the first, second and third localities, with the dates of the beginning and ending of each outbreak. (Compiled from reports of health officers who were able to trace the source of contagium to other localities.)*

Number.†	First Localities from which Scarlet Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths	Localities.	Cases.	Deaths	Localities.	Cases.	Deaths.
1	Alcona county: Gustin township (May 16-May 30.)	2	0	Alcona county: Harrisville township. (June-July 30.)	6	0			
2	Alpena county: Alpena city (Jan. 5-Jan. 5, 1895.)	96	4	Alpena county: Alpena township (Apr. 1-Apr. 20.)	1	0			
3	Antrim county: Mancelona village (May 16-May 26.)	1	0	Antrim county: Custer township	5	0			
4	Barry county: Carlton township	*		Barry county: Hastings township (Feb. 5-Feb. 20.)	1	0			
5	Barry county: Nashville village	*		Eaton county: Kalamo township (Dec. 9-Dec. 20.)	1	0			
				Bay county: Pinconning township (June 13-June 19.)	1	0			
6	Bay county: Bay City (Apr. 7-Dec. 29.)	22	0	Oakland county: Clarkston village (Oct. 7-Nov. 10.)	15	0			
				Ogemaw county: Cumming township (June 22-Oct. 12.)	5	0			
7	Benzie county: Lake Ann village (Feb. 5-Feb. 17.)	1	0	Benzie county: Inland township (Feb. 19-Mar. 10.)	2	1			
8	Branch county: Butler township (May 17-Sept. 15.)	12	0	Calhoun county: Clareadon township. (June 18-July —.)	6	0			
9	Calhoun county: Athens township (Aug. —Dec. 30.)	29	2	Branch county: Union City village (Sept. 8-Dec. 17.)	8	0	St. Joseph county: Colon township‡ (Dec. 5-Dec. 29.)	4	0
10	Charlevoix county: Boyne Falls village	*		Emmet county: Petoskey village (June 20-June 30.)	2	0	Emmet county: Maple River Twp.§ (July 14-Aug. 11.)	1	0
11	Cheboygan county: Forest township	*		Otsego county: Elmira township (Sept. 1-Sept. 17.)	1	0			
12	Charlevoix county: South Arm township	*		Charlevoix county: Wilson township (Apr. 10-May 12.)	2	0			
13	Clinton county: Westphalia village	6	0	Ionia county: Muir village (June-Dec. 25.)	13	0			

* Scarlet fever was not reported to this Office by the health officer of the "first" locality at the time it was said to have spread from there; showing that the disease, if present, was neglected; probably it was not reported to the health officer as the law requires.

† The consecutive numbers in this column refer to similar consecutive numbers before quotations in the text following this table.

‡ From Colon township to Lenawee county, Rome township, 22 cases.

§ From Maple River township to a fourth locality, Littlefield township, Emmet county, one case.

TABLE 8.—CONTINUED.— *Movement of Infection.*

ıt Localities from which arlet Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
county: naba city.....		0	Delta county: Ford River township. (Aug. 22 —.)	1	0			
ı county: ıel township..... r. 2-July 1.)	20	0	Eaton county: Chester township.... (— June 22.)	15	2	Eaton county: Vermontville village. (Sept. 19—Oct. 18.)	2	0
ı county: ınd township.....		----	Eaton county: Chester township.... (Dec. 31—.)	1	0			
ı county: ın Rapids Twp.... g. 23—.)		0	Ingham county: Aurelius township...	1	0			
			Genesee county: Davidson township.. Mundy township.... (July 19 —.)	10 15	0 0			
ıee county: t city..... n. 9-Feb. 9, 1895.)	141	3	Tuscola county: Arbela township..... (Nov. 12-Dec. 15.)	9	0			
'raverse county: erse City village..	*	----	Cass county: Cassopolis village... (Mar. 12-Mar. 22.)	1	0			
			Leelanaw county: Bingham township.. (Feb. 28—.)	1	1			
ot county.....		----	Ingham county: Meridian township..	11	0	Ingham county: Alaiedon township... (Feb.—.) LeRoy township..... (Mar. 8-Apr. 10.)	2 4	0 0
ot county: ca village..... Dec. 1.)	8	0	Gratiot county: Newark township.... (Dec. 1—.)	1	0			
ot county: inton village.. ..		1	Montcalm county: Richland township.. (Dec.25-Jan.10, 1895.)	1	0			
dale county: ıeville village.		0	Hillsdale county: Hillsdale city.....	22	1	Calhoun county: Clarendon township.	7	0
ım county: sing city..... Jan.)		0	Eaton county: Delta township. .. (May 26-June 14.)	1	0			
ım county: te Oak township.. Dec.)		1	Ingham county: LeRoy township..... (Oct. 13-Nov. 30.)	4	0			
. county: ssa township pt. 9-Nov. 12.)	10	0	Ionia county: Campbell township.. (Oct. 12-Oct. 30.)	3	1			
lla county: Pleasant city.. ... n. 3-Jan. 3, 1895.)	150	0	Isabella county: Chippewa township.. (Apr.-Apr.)	4	0			
ıon county: over township		0	Jackson county: Concord village..... (Apr. 17-May 10.)	3	0			

t fever was not reported to this Office by the health officer of the "first" locality at the time it to have spread from there; showing that the disease, if present, was neglected; probably it sported to the health officer as the law requires.
nsecutive numbers in this column refer to similar consecutive numbers before quotations t following this table.

TABLE 8—CONTINUED—*Movement of Infection.*

Number.†	First Localities from which Scarlet Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
29	Jackson county: Jackson city (Jan. 22-Dec. 24.)	36	1	Ingham county: Leslie village (Aug. 3-Aug. 13.)	1	0	Ingham county: Vevay township‡	1	0
30	Jackson county: Sandstone township (Jan.— Apr. 1.)	8	0	Jackson county: Parma township (Jan.—Apr. 30.)	13	0			
31	Kalamazoo county: Kalamazoo city (Jan. 6-Jan. 5, 1895.)	75	0	Kalamazoo county: Oshtemo township (Nov. 27-Dec. 25.)	8	0			
32	Kent county: Grand Rapids city (Jan. 1-Dec. 29.)	159	10	Kent county: Plainfield township (May 20-Nov. 14.)	60	0			
				Sand Lake village (Mar. 17-Apr. 30.)	6	0			
				Mecosta county: Mecosta village (Oct. 30-Dec. 30.)	11	0			
				Muskegon county: North Muskegon city (May 28-July 25.)	9	0			
33	Kent county: Grattan township (July 6-July 20.)	4	0	Ionia county: Otisco township (Aug. 10-Feb. 25, '95.)	20	0			
34	Kent county: Lowell township	*	----	Kent county: Bowne township (Jan. 29-Feb. 12.)	1	0			
35	Kent county: Oakfield township	*	----	Montcalm county: Eureka township (Dec. 28-Jan. 21,'95.)	2	0			
36	Kent county: Plainfield township	7	0	Kent county: Rockford village (Jan. 4—.)	25	0	Kent county: Cedar Springs village (Jan. 4—.)	1	0
				Cannon township (Mar. 20-Apr. 14.)	1	0	Courtland township (Jan. 7-Mar.—.)	8	0
37	Lenawee county: Deerfield township (Feb. 11-Oct.)	5	1	Lenawee county: Raisin township (Mar. 2-Mar. 16.)	2	0			
38	Livingston county: Handy township (Sept. 8-Sept. 26.)	3	0	Livingston county: Conway township (Oct. 26-Dec. 10.)	2	0			
39	Macomb county: Mt. Clemens city (May- Nov.)	25	1	Wayne county: Hamtramck twp. (Oct. 29-Dec. 27.)	3	0			
40	Manistee county: Stronach township (Jan. 10-June 28.)	1	0	Manistee county: Manistee city (Feb. 7-June 2.)	2	0			
41	Marquette county: Ishpeming city (Jan. 6-Jan. 5, 1895.)	128	5	Marquette county: Ely township (Apr. 1-May 5.)	9	0			
				Champion township. Jan.-Sept.)	12	1			

* Scarlet fever was not reported to this office by the health Officer of the "first" locality at the time it was said to have spread from there; showing that the disease, if present, was neglected; probably it was not reported to the health officer as the law requires.

† The consecutive numbers in this column refer to similar consecutive numbers before quotations in the text following this table.

‡ From Vevay township to a fourth locality, Aurelius township, Ingham county, 17 cases.

TABLE 8.—CONTINUED.—*Movement of infection.*

Number.†	First Localities from which Scarlet Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
42	Mecosta county: Big Rapids city (Jan. 2-Apr. 19.)	4	1	Osceola county: Richmond township. (Apr. 2-Apr. 27.)	8	0			
43	Mecosta county: Green township (June 30-Aug. 11.)	4	1	Osceola county: Richmond township.	1	0			
44	Menominee county: Spalding township (Nov. 15—.)	3	0	Menominee county: Cedarville township. (Dec. 11-Dec. 19.)	1	1			
45	Missaukee county: Riverside township (Jan. 3—·)	8	0	Missaukee county: Lake township (Jan. 27-Apr. 15.)	9	0	Missaukee county: Lake City village‡ (Jan.-Mar.)	5	1
46	Montcalm county: Sidney township (Jan. 5—Jan. 5, 1895.)	19	0	Montcalm county: Fair Plains township. (Apr. 5-June 25.)	5	1			
47	Montmorency county: Wheatfield township	*		Montmorency county: Vienna township (Sept. 1-Nov.)	6	1			
48	Muskegon county: Muskegon city (Mar. 12-Dec.)	42	2	Muskegon county: North Muskegon city. (Oct. 29-Nov. 15.)	1	0			
49	Oakland county: Milford township (Jan. 11-Apr.)	10	0	Oakland county: Milford village (Jan. 15-May 10.)	10	0			
50	Osceola county: Lincoln township (Jan. 14-Feb. 24.)	9	0	Osceola county: Richmond township. (Apr. 10-June 6.)	3	1			
51	Ottawa county: Chester township (— Nov. 5.)	13	1	Ottawa county: Wright township (May 20-Nov. 24.)	12	0			
52	Saginaw county: Saginaw city (Jan. 1-Dec. 31.)	71	0	Sanilac county: Elk township (Jan. 4-Feb. 22.)	6	0			
53	Sanilac county: Lamont township	*		Tuscola county: Mayville village (Mar. 5-Mar. 21.)	4	0			
54	Shiawassee county: Corunna city	*		Shiawassee county: Laingsburg village (Apr. 1-Apr. 20.)	1	0	Shiawassee county: Perry village (July 27-Aug. 11.)	2	0
55	Shiawassee county: Owosso city (Jan. 12-June, 1895.)	31	0	Shiawassee county: Rush township (Oct. 10-Oct. 30.)	1	0	Shiawassee county: New Haven township.	5	0
				Rush township (Nov. 7-Nov. 23.)	1	0			
56	Shiawassee county			Livingston county: Cohoctah township (May 25-June 8.)	4	0			
57	St. Clair county: Kenockee township	*		St Clair county: China township (July 16—.)	1	0			

*Scarlet Fever was not reported to this Office by the health officer of the "first" locality at the time it was said to have spread from there; showing that the disease, if present, was neglected; probably it was not reported to the health officer as the law requires.

†The consecutive numbers in this column refer to similar consecutive numbers before quotations in the text following this table.

‡From Lake City village to Montcalm county, Pierson township, 36 cases.

TABLE 8.—CONTINUED.—*Movement of infection.*

Number.†	First Localities from which Scarlet Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
58	St. Clair county: Marine City (Sept. 7-Jan. 2, 1895.)	80	0	Macomb county: New Baltimore village (Oct. 25—.)	4	0			
59	St. Joseph county: Leonidas township (Apr.-May.)	10	0	St. Joseph county: Mendon village (Aug. 20-Sept. 15.)	1	0			
60	St. Joseph county: Lockport township	*	----	St. Joseph county: Mendon township (Nov. 13-Dec. 30.)	7	0			
61	St. Joseph county: Sherman township (Jan. 1-Feb. 1.)	4	0	St. Joseph county: Centreville village (Apr. 9—.)	1	0			
62	St. Joseph county: Three Rivers village (Aug. 8-Oct.)	2	1	St. Joseph county: Park township (Aug.-Oct. 2.)	15	0			
63	St. Joseph county: White Pigeon village (Oct. 25-Dec. 18.)	8	0	Newaygo county: Big Prairie township (Oct. 28-Nov. 15.)	1	0			
				St. Joseph county: Florence township	9	0			
64	Tuscola county: Fair Grove township (Feb.-Mar.)	2	0	Tuscola county: Akron township (Apr. 1-Apr. 30.)	1	1			
65	Van Buren county: Hartford village (Aug. 17-Mar. 16, 1895.)	5	0	Van Buren county: Keeler township (Dec. 10-Dec. 23.)	1	0			
66	Van Buren county: Lawrence township	6	1	Van Buren county: Paw Paw township	3	0			
67	Washtenaw county: Manchester township (Mar. 18—.)	2	1	Lenawee county: Franklin township (Apr. 12—.)	3	0			
68	Washtenaw county: Scio township	*	----	Washtenaw county: Dexter township (Jan.-July.)	20	1			
69	Washtenaw county: Superior township	*	----	Washtenaw county: Ypsilanti city (Jan. 12-Jan. 26.)	7	0			
70	Wayne county: Detroit city (Jan. 1-Dec. 31.)	365	11	Eaton county: Walton township (June 8-July 14.)	5	0			
				Oakland county: Southfield township (Nov. 21—.)	1	0			
				Wayne county: Hamtramck township (Apr. 15-May 1.)	4	0			
				Springwells township (May 14-Dec. 25)	22	0			
				Taylor township (—Apr. 20.)	5	0			

* Scarlet Fever was not reported to this Office by the health officer of the "first" locality at the time it was said to have spread from there; showing that the disease, if present, was neglected; probably it was not reported to the health officer as the law requires.

† The consecutive numbers in this column refer to similar consecutive numbers before quotations in the text following this table.

TABLE 8.—CONTINUED.—*Movement of Infection.*

Number.†	First Localities from which Scarlet Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
71	Wexford county: Cadillac city (Jan. 3-Aug. 4.)	51	7	Kalkaska county: Kalkaska village (July 6-July 21.)	1	0			
				Osceola county: Middle Branch twp. (Jan. 23-Feb. 5.)	1	0			
				Wexford county: Clam Lake township. (Apr. 28-May 4.)	3	0			
72	Northern part of Mich.	----	----	Van Buren county: Bangor township (Apr.-Aug. 25.)	13	0			
73	Northern Peninsula	----	----	Bangor village (Apr.-July.)	24	0			
	(*Movement of infection* Into Michigan *from outside the State.*)								
74	Canada	----	----	Oakland county: Novi township (June 24-July 25.)	1	0	Oakland county: Commerce township. (Aug. 6-Sept. 17.)	1	0
				Schoolcraft county: Seney township (Nov.-Dec. 29.)	11	1			
75	Illinois: Freeport	----	----	Berrien county: Benton Harbor city (Jan.-Nov. 16.)	12	1	Berrien county: Watervliet township. (Feb. 10-Apr. 15.)	6	0
							Van Buren county: Keeler township (Jan. 23-Apr. 14.)	3	0
76	Indiana	----	----	Berrien county: Buchanan village (Apr. 14—.)	2	0			
				St. Joseph county: Mottville township. (Jan. 14-Mar. 10.)	7	0			
77	Indiana: Winchester	----	----	Lenawee county: Blissfield village (Dec. 27—.)	2	0			
78	Kansas	----	----	Calhoun county: Battle Creek township (Oct.-Dec. 29.)	8	0			
79	Ohio: Bryan	----	----	Calhoun county: Albion city (Aug. 9-Jan. 19, 1895.)	5	0			
				Benzie county: Thompsonville village (July 8-July 25.)	3	0			
80	Ohio: Toledo	----	----	Lenawee county: Palmyra township (Jan. 1-May.)	16	0			
				Monroe county: Erie township (July 30-Aug. 30.)	4	0			
81	Wisconsin	----	----	Dickinson county: Felch township (May 3-July 1.)	2	0			
82	Wisconsin: Green Bay	----	----	Dickinson county: Sagola township (Oct. 19-Nov. 20.)	3	0			

†The consecutive numbers in this column refer to similar consecutive numbers before quotations in the text following this table.

TABLE 8.—CONTINUED.—**Probable *Movement of Infection.***

Number.†	First Localities from which Scarlet Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
83	Bay county: Bay city	22	0	Bay county: Pinconning village	2	0			
84	Branch county: Sherwood township (Sept. -Dec. 1.)	17	1	Branch county: Sherwood village (Sept. 26-Dec. 1.)	5	0			
85	Calhoun county: Athens township (Aug. -Dec. 30.)	29	2	Calhoun county: Le Roy township (Dec. 2-Jan. 12, 1895.)	6	0			
86	Cass county: Calvin township	*		Cass county: Porter township (June 23-July 10.)	1	0			
87	Cass county: Dowagiac city (July 23—.)	1	0	Van Buren county: Keeler township (Oct -Nov. 10.)	1	0			
88	Chippewa county: Detour township (Dec. 10-May 23, 1895.)	84	13	Chippewa county: Pickford township (Dec. 30-Apr. 1, 1895.)	12	3			
89	Clinton county: St. Johns village	13	1	Clinton county: Eagle township	2	0			
90	Eaton county: Bellevue village	*		Eaton county: Walton township (Nov. 4-Feb. 7, 1895.)	27	0			
91	Genesee county: Flint city (Feb. 9-Feb. 9, 1895.)	141	3	Genesee county: Flushing village (Aug. 21-Sept. 14.)	1	0			
92	Genesee county: Flint township (Sept. 9-Dec. 10.)	2	0	Genesee county: Clayton township (Dec. 23-Dec. —.)	5	0			
93	Genesee county: Linden village	*		Genesee county: Fenton village (Feb. 1-Aug. 12.)	23	0			
94	Gratiot county: Ithaca village (Sept. 9-Dec.)	8	0	Gratiot county: Arcade township (Nov.22-Jan.16,1895.)	8	2			
95	Gratiot county: New Haven township	*		Gratiot county: Fulton township (Jan. 20-Mar. 4.)	3	0	Clinton county: Essex township (Apr. 14-May 10.)	3	2
96	Gratiot county: Perrinton village (Feb. 1-May 1.)	11	1	Clinton county: Maple Rapids village (Feb. 11 —.)	4	0	Gratiot county: Fulton township (Mar. 23-July —.)	8	0
97	Ingham county: Lansing city (Jan. 3—.)	2	0	Ingham county: Wheatfield township. (Jan. 21-Mar. 20.)	2	2			
98	Jackson county			Hillsdale county: Somerset township (Nov. 25-Dec. 29.)	1	0			
99	Kent county: Grand Rapids city (Jan. 1-Dec. 29.)	159	10	Kent county: Bowne township (Mar. 18-Nov. 1.) Gaines township (Sept. 14-Jan. 1,1895.)	13 6	0 1			

*Scarlet Fever was not reported to this Office by the health officer of the "first" locality at the time it was said to have spread from there; showing that the disease, if present, was neglected; probably it was not reported to the health officer as the law requires.

†The consecutive numbers in this column refer to similar consecutive numbers before quotations in the text following this table.

TABLE 8.—CONTINUED.—**Probable *Movement of Infection.***

Number.†	First Localities from which Scarlet Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
100	Lapeer county: Dryden township..... (Jan. 5—.)	100	0	Oakland county: Leonard village..... (Mar. 24-Apr. —.)	1	0			
101	Montcalm county: Douglas township..... (Mar. 2-Apr. 28.)	8	0	Montcalm county: McBride village..... (Apr. 16 —.)	3	0			
102	Montcalm county: Greenville city..... (Jan. 1-Aug. 14.)	26	0	Kent county: Grattan township..... (July 6-July 20.)	4	0			
103	Oakland county: Clarkston village..... (Oct. 7-Nov. 10.)	15	0	Oakland county: Brandon township... (Nov. 3-Dec. 4.)	1	0			
104	Oakland county: Oxford village..... (Jan. 13-Feb. 20.)	3	0	Lapeer county: Deerfield township.... (Apr. 1-May 1.)	6	0			
105	Saginaw county: Saginaw city..... (Jan. 1-Dec. 31.)	71	0	Saginaw county: Birch Run township. (Jan. 3-Mar. 24.)	2	0			
106	St. Clair county: Marine city..... (Sept. 7-Jan. 2, 1895.)	80	0	St. Clair county: Algonac village (Nov. 14-Nov. 26.)	1	0			
107	St. Joseph county: Mendon village (Aug. 20-Sept. 15.)	1	0	Kalamazoo county: Prairie Ronde twp.... (Oct. 23-Dec. 6.)	1	0			
108	St. Joseph county: Sturgis village (Jan. 23-July 12.)	40	2	St. Joseph county: Burr Oak village..... (Feb. 1-May 10.)	13	0			
109	Van Buren county: Paw Paw township ... (Aug. 10-Aug. 27.)	3	0	Van Buren county: Lawrence township.. (Sept. —.)	6	1			
110	Van Buren county: South Haven village..	*		Van Buren county: Hartford township... (July 30-Mar. 10.)	9	0			
111	Washtenaw county: Ann Arbor city..... (May-Oct.)	20	8	Washtenaw county: Salem township..... (June 18-July 30.)	1	0			
112	Wayne county: Detroit city..... (Jan. 1-Dec. 31.)	365	11	Macomb county: Warren village..... (July 6-July 26.) St. Clair county: Yale village (Sept. 19-Oct. 12.) Wayne county: Monguagon township (Mar. 28-Dec. 5.)	1 1 17	0 0 7			
113	Wexford county: Cadillac city..... (Jan. 3-Aug. 4.)	51	7	St. Joseph county: Centreville village.... (Dec. 4-Mar. 2, 1895.)	9	1			

* Scarlet Fever was not reported to this Office by the health officer of the "first" locality at the time it was said to have spread from there; showing that the disease, if present, was neglected; probably it was not reported to the health officer as the law requires.

† The consecutive numbers in this column refer to similar consecutive numbers before quotations in the text following this table.

TABLE 8.—CONTINUED.—**Probable *Movement of Infection* Into Michigan *from outside the State.***

Number.†	First Localities from which Scarlet Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
114	Canada	----	----	St. Clair county: Capac village (May 28-June —.)	1	0			
115	Illinois	----	----	Jackson county: Hanover township (Sept. 21-Dec. 20.)	5	0			
116	Indiana: Marion	----	----	Berrien county: Niles city (Nov. 1-Jan. 18, 1895.)	2	0			
117	Indiana: South Bend	----	----	Cass county: Jefferson township	5	0			
118	Ohio	----	----	Lake county: Luther village (Aug. 11-Sept. 8.)	1	0			

* Scarlet Fever was not reported to this Office by the health officer of the "first" locality at the time it was said to have spread from there; showing that the disease, if present, was neglected; probably it was not reported to the health officer as the law requires.

† The consecutive numbers in this column refer to similer consecutive numbers before quotations in the text following this table.

Outbreaks of Scarlet Fever Traced to a Former Case in Another Jurisdiction.

The following are extracts from the reports of health officers who were able to trace the outbreaks of scarlet fever in their respective jurisdictions to cases of the disease outside their jurisdictions,—with the name of the health officer, and of the jurisdiction subjoined. These quotations concerning the spread of contagium from first to second, from second to third, and even to fourth localities, are arranged in the same order as the "First Localities" in the first column of Table 8, thus giving the source of each report. The consecutive numbers placed before these quotations refer to similar numbers in the first column of Table 8 of this article.

1. "Gustin township."—*S. S. Ludlum, M. D., Harrisville township, Alcona county.*

2. "City of Alpena."—*Wm. Morris, Alpena township, Alpena county.*

3. "Contracted in the village of Mancelona."—*O. B. Orcutt, clerk, Custer township, Antrim county.*

4. "From Carlton township."—*Wallace A. Hobbs, Hastings township, Barry county.*

5. "From Nashville."—*L. C. Jones, M. D., Kalamo township, Eaton county.*

6. "Came from Bay City."—*W. B. Abbott, M. D., Pinconning township, Bay county.*

6. "Mrs. H—visited friends in Bay City. Members of one of the families where she visited were just recovering from scarlet fever. Two of her small children were with her. The two children were taken with scarlet fever a few days after."—*J. Goodenough, M. D., Clarkston village, Oakland county.*

6. "A boy and girl brought from Bay City and adopted by a family here were first taken sick. No physician was called and ignorance predominated."—*H. M. Ammond, M. D., Cumming township, Ogemaw county.*

7. "Brought from Lake Ann."—*E. P. Alpin, Inland township, Benzie county.*

8. "It was brought in my jurisdiction by children going to school in the township of Butler."—*Joseph E. Daniels, Clarendon township, Calhoun county.*

9. "Athens township."—*E. H. Hurd, M. D., Union City village, Branch county.*

MOVEMENTS OF CONTAGIUM OF SCARLET FEVER IN 1894.



9. "The outbreak occurred from a child from Union City, who with her mother was on a visit with friends here."—*Isaac Sides, M. D., Colon township,* St. Joseph county.*

9. "Aunt of the first patient came from Colon, St. Joseph county, with her little boy, Aug. 11. The little boy had been having sore throat and other symptoms of scarlet fever, but had no doctor."—*E. J Ross, M. D., Rome township,† Lenawee county.*

10. "Family had recently, ten days before, moved to Petoskey from Boyne Falls, Mich. They must have brought the disease with them."—*A. G. Oven, M. D., Petoskey village, Emmet county.*

10. "From Petoskey."—*H. W. Moreford, Maple River township,* Emmet county.*

10. "Maple River township."—*J. W. Hawkey, M. D., Littlefield township,† Emmet county.*

11. "Came from Cheboygan county after breaking out with rash." [Forest township.]—*B. P. Pierce, M. D., Elmira township, Otsego county.*

12. "From the village of South Arm, had been there visiting."—*John W. Isaman, Wilson township Charlevoix county.*

13. "A small child came here from Westphalia, and I learned afterwards had a scarlet rash. It was not reported to me."—*C. D. Smith, M. D., Muir village, Ionia county.*

14. "Escanaba."—*O. E. Nelson, Ford River township, Delta county.*

15. "From the township of Carmel."—*J. W. Clement, Chester township, Eaton county.*

15. "By exposure to a case in Chester township."—*Chas. S. Snell, M. D., Vermontville village,* Eaton county.*

16. "From Roxand township."—*J. W. Clement, Chester township, Eaton county.*

17. "A cloak was brought into the house which had just been made in a house in [Eaton Rapids township] Peterville, Eaton Co., where there had been a case of scarlet fever."—*Geo. W. Swartwout, M. D., Aurelius township, Ingham county.*

18. "From Flint."—*E. B. Gardner, M. D., Davison township, Genesee county.*

18. "From Flint."—*Chas. B. Pearson, M. D., Mundy township, Genesee county.*

18. "From people visiting here from Flint."—*Henry A. Daniells, Arbela township, Tuscola county.*

19. "Mrs. H—, with one of her two children, visited Traverse City, and her child acquired the disease while making the visit and returned home too early."—*Thomas A. Anderson, M. D., Cassopolis village, Cass county.*

19. "Mr. W—— told me that he and his family had been in Traverse City attending church. Scarlet fever said to be in Traverse City. The child must have been exposed there."—*Wm. Mebert, Bingham township, Leelanaw county.*

20. "A man moved from Gratiot Co., here. He had a child die in Feb., '94, of scarlet fever. He went to this house, and the child came down with the fever in a few days."—*W. N. Diamond, M. D., Meridian township, Ingham county.*

20. "From Meridian township."—*E. D. Millis, M. D., [health officer of LeRoy township,] Alaiedon township,* Ingham county.*

20. "Was exposed while visiting near Okemos, (Meridian Tp.)"—*E. D. Millis, M. D., LeRoy township,* Ingham county.*

21. "Was exposed in Ithaca."—*Chas. A. Smith, clerk, Newark township, Gratiot county.*

22. "By girl bringing it from Perrinton [village]. Came into this township before she was done scaling."—*J. M. Freeman, Richland township, Montcalm county.*

23. "The fever came into our public schools from the public schools of the city of Jonesville. A family attending both Jonesville and Hillsdale schools coming down with it."—*E. E. Moore, M. D., Hillsdale city, Hillsdale county.*

23. "The first case was brought from Hillsdale."—*Joseph E. Daniels, Clarendon township, Calhoun county.*

24. "By children coming from Lansing from families in which the disease was at that time and playing with children here."—*J. W. Dann, Delta township, Eaton county.*

25. "Case in school from the township of White Oak."—*Frank N. Turner, M. D., LeRoy township, Ingham county.*

26. "From Odessa township."—*W. H. Landis, M. D., Campbell township, Ionia county.*

27. "Mt. Pleasant city."—*G. B. Richmond, clerk, Chippewa township, Isabella county.*

28. "The first family moved into my jurisdiction from the township of Hanover, Jackson Co., and the case was not reported. I learned, accidentally, the child was desquamating."—*Wm. N. Keeler, M. D., Concord village, Jackson county.*

* Third locality infected from second, shown in Table 8.

† Fourth locality infected from third.

29. "A woman came from Jackson, brought a little boy who came down with scarlet sever in a day or two."—*John N. Greene, M. D., Leslie village, Ingham county.*

29. "Exposed at Leslie."—*Joseph Jewett, Vevay township, Ingham county.*

29. "The disease was brought into the family by a little child who had been sick with the disease in the house of Mr. P—— in Vevay. They did not know that the child had scarlet fever."—*Geo. W. Swartwout, M. D., Aurelius township,† Ingham county.*

30. "By visiting Sandstone."—*W. W. Dean, Parma township, Jackson county.*

31. "Brought into the township from Kalamazoo."—*Grant Ide, M. D., Oshtemo township, Kalamazoo county.*

32. "A servant girl at Grand Rapids came home sick and her parents did not recognize scarlatina. The first family, mother and child, called there."—*Wm. Hyser, M. D., Plainfield township, Kent county.*

32. "Brought from Grand Rapids by a child visiting here."—*A. R. Hicks, M. D., Sand Lake village Kent county.*

32. "Source must have been Grand Rapids. Parents visiting with child two years old and boy eleven years old. Infant contracted disease first, not reported to me."—*John Snyder, M. D., Mecosta village Mecosta county.*

32. "Brought from Grand Rapids."—*P. W. Pearsall, M. D., North Muskegon city, Muskegon county.*

33. "A child of a family of Tp. of Grattan who had been ill of some supposed 'simple rash' came visiting cousins while convalescent from the malady."—*Wm. Bell, M. D., Otisco township, Ionia county.*

34. "Communicated from jurisdiction of Lowell township."—*J. Hunter, M. D., Bowne township, Kent county.*

35. "From Oakfield, Kent Co."—*Geo. W. Gravelle, Eureka township, Montcalm county.*

36. "Plainfield."—*Hollis O. Sarber, M. D., Rockford village, Kent county.*

36. "Patient contracted disease in Rockford. Was taken sick while visiting friends here."—*J. B. Dewar, M. D., Cedar Springs village,* Kent county.*

36. "A general outbreak at the town of Rockford, adjoining this township."—*W. D. Schouten, M. D., Courtland township, Kent county.*

36. "The disease was brought into my jurisdiction from Plainfield, an adjoining township."—*Aaron Clark, M. D., Cannon township, Kent county.*

37. "Visiting in Deerfield."—*J. W. Nixon, M. D., Raisin township, Lenawee county.*

38. "Some friends called the day before from Handy township, Livingston county."—*Wm. H. Billings, Conway township, Livingston county.*

39. "A family from near Mt. Clemens, who had lost a child shortly before from scarlet fever, had been visiting in the neighborhood, and the children in that family were sick from the disease and had been going to school until eruption appeared."—*A. Stewart, M. D., Hamtramck township, Wayne county.*

40. "While at Stronach visiting."—*D. E. Robinson, M. D., Manistee city, Manistee county.*

41. "Contracted at Ishpeming."—*Philo P. Chase, clerk, Ely township, Marquette county.*

41. "Ishpeming, Mich."—*R. S. Walker, Champion township, Marquette county.*

42. "From a child in Big Rapids."—*A. W. Miller, M. D., Richmond township, Osceola county.*

43. "From a child in Paris."—*A. W. Miller, M. D., Richmond township, Osceola county.*

44. "Was brought here by a party from Spalding."—*Geo. N. Hill, Cedarville township, Menominee county.*

45. "From Riverside township."—*R. Feely, Lake township, Missaukee county.*

45. "From Lake township."—*J. W. Decker, M. D., Lake City village,* Missaukee county.*

45. "The mother went to nurse some children near Lake city, and in some way communicated it to her own family."—*J. R. DeWolf, Pierson township,† Montcalm county.*

46. "From the township of Sidney."—*C. M. Barnes, M. D., Fairplains township, Montcalm county.*

47. "Contracted from visiting friends in the Tp. of Wheatfield."—*John McClenathen, Vienna township, Montmorency county.*

48. "Mother coming from Muskegon city, having been working where the disease was."—*P. W. Pearsall, M. D., North Muskegon city, Muskegon county.*

49. "From the township of Milford."—*Thos. J. Jackson, M. D., Milford village, Oakland county.*

50. "From brother's children living in Ashton Tp."—*A. W. Miller, M. D., Richmond township, Osceola county.*

* Third locality infected from second, shown in Table 8.

† Fourth locality infected from third.

51. "From exposure to a case in the township of Chester."—*C. E. Chappell, M. D., Wright township Ottawa county.*

52. "The disease was contracted in Saginaw by a young boy visiting there."—*L. E. Cochran, M. D., Elk township, Sanilac county.*

53. "Parties were visiting in Lamont township, Sanilac county, and brought the disease with them."—*B. C. Bradshaw, M. D., Mayville village, Tuscola county.*

54. "Patient was exposed in a hotel in Corunna by a waiting girl."—*C. M. Freeman, M D., Laingsburg village, Shiawassee county.*

54. "Parents went to Laingsburg visiting, caught it while there, brought it home and child came down with it in about nine days after returning home."—*H. W. Cobb, M. D., Perry village*, Shiawassee county.*

55. "A boy about nine or ten while in Owosso selling potatoes with his brothers. A man came out of a house where there was scarlet fever, looked at the potatoes, bargained for them, and Chas'. brother carried the potatoes into the house or cellar. Chas. did not go in the house or yard. Came down with it a few days later."—*L. R. Lumby, M. D., Rush township, Shiawassee county.*

55. "It was caught from Rush township."—*John Boyd, New Haven township,* Shiawassee county.*

55. "A boy about five years old. Family visited in Owosso. Supposed he was exposed to it while playing with some children on the street who had been exposed."—*L. R. Lumby, M. D., Rush township, Shiawassee county.*

56. "From cases in Shiawassee county."—*Wm. H. Erwin, M. D., Cohoctah township, Livingston county.*

57. "Carried in clothing from Kenockee township."—*Benton Osborne, clerk, China township, St. Clair county.*

58. "Brought child from family in Marine City where they had scarlet fever in a very mild form. Child came down with the disease the next day after arrival here."—*Lewis P. May, M. D., New Baltimore village, Macomb county.*

59. "A pair of shoes from a cousin in Leonidas township was given to this patient and in a week this child was taken."—*Edwin Stewart, M. D., Mendon village, St. Joseph county.*

60. "Mrs. W.'s sister went home to her family in Lockport township. Was sick and returned to W.'s when able to work and while still exfoliating. Mrs. W. was taken and her sister and neighbor came with her three children, who all had scarlet fever."—*Edwin Stewart, M. D., Mendon township, St. Joseph county.*

61. "Introduced by a servant, whose family had the disease, residing in Sherman township."—*B. M. Porter, M. D., Centreville village, St. Joseph county.*

62. "Exposure by being with parties in Three Rivers. It was kept quiet until it spread so that it was impossible to keep it any longer. I was not notified at the time."—*H. M. Arane, M. D., Park township, St. Joseph county.*

63. "Family came from White Pigeon, Mich., to visit in our township and brought the disease with them."—*W. Slade, supervisor, Big Prairie township, Newaygo county.*

63. "Came from White Pigeon."—*Frank Hull, Florence township, St. Joseph county.*

64. "Carried in clothing from a case in Fair Grove township."—*Geo. P. Honeywell, Akron township, Tuscola county.*

65. "Child visited an uncle in Hartford after they had had scarlet fever in the family at Hartford."—*Samuel Stevens, M. D., Keeler township, Van Buren county.*

66. "Immediate contagion from one case of mild scarlatina in a young man who went to a picnic before all proper precautions had been taken. [Lawrence Tp.]"—*Wilber F. Hoyt, M. D., Paw Paw township Van Buren county.*

67. "Was taken from a family in Manchester."—*J. D. Tripp, Franklin township, Lenawee county.*

68. "Brought by a visitor from Scio."—*Patrick Fleming, Dexter township, Washtenaw county.*

69. "Dr. Batwell said it was taken from a case in the town of Superior."—*Wm. Patterson, M. D., Ypsilanti city, Washtenaw county.*

70. "A young man brought from Detroit last fall and not properly disinfecting the house."—*J. S. Newland, M. D., Walton township, Eaton county.*

70. "A person came from Detroit who had been exposed."—*S. D. Holcomb, M. D., Southfield township, Oakland county.*

70. "A relative from the city [Detroit] had been visiting while suffering from some eruptive disease, but had been called chicken-pox."—*A. Stewart, M. D., Hamtramck township, Wayne county.*

*Third locality infected from second, shown in Table 8.

70. "Exposure at Holy Redeemer school in city. [Detroit.]"—*Fred. J. Clippert, M. D., Springwells township, Wayne county.*

71. "July 4, the patient was exposed to disease at Cadillac."—*R. S. Trask, M. D., Kalkaska village, Kalkaska county.*

71. "Brought in from Cadillac."—*L. B. Updike, Middlebranch township, Osceola county.*

71. "Cadillac city."—*James Hawthorne, Clam Lake township, Wexford county.*

72. "Mrs. —— came from the northern part of Mich. to Bangor bringing a child still peeling from the effects of scarlet fever."—*J. Camp, M. D., Bangor township, Van Buren county.*

73. "Northern Peninsula.' —*J. Camp, M. D., Bangor village, Van Buren county.*

Outbreaks in Michigan Traced to Outbreaks Outside of the State.

74. "The patient contracted said disease while on a visit to Canada by being in a house where said disease had previously existed, but said patient had moved out twenty days previous."—*Daniel C. Dunham, Novi township, Oakland county.*

74. "Was by person or clothing of a case from the township of Novi."—*E. A. Chapman, M. D., Commerce township,* Oakland county.*

74. "Brought from Canada."—*F. P. Bohn, M. D., Seney township, Schoolcraft county.*

75. "Brought from Freeport, Ill."—*Frank A. Votey, M. D., Benton Harbor city, Berrien county.*

75. "A member of first family came home from Benton Harbor with sore throat, not knowing the cause, subsequent cases were from this one."—*W. L. Garratt, M. D., Watervliet township,* Berrien county.*

75. "This case was taken from a brother who came from Benton Harbor school."—*Samuel Stevens, M. D., Keeler township,* Van Buren county.*

76. "Two cases originated in Indiana and children brought here."—*H. M. Broderick, M. D., Buchanan village, Berrien county.*

76. "The family had visited at a relative's in Indiana where they had scarlet fever."—*John J. Sweetland, Motiville township, St. Joseph county.*

77. "Winchester, Ind."—*J. M. Barnes, M. D., Blissfield village, Lenawee county.*

78. "Brought here from Kansas by a person not fully recovered."—*Geo. W. Betterley, Battle Creek township, Calhoun county.*

79. "Bryan, Ohio."—*A. M. Haight, M. D., Albion city, Calhoun county.*

80. "Contracted in Toledo, Ohio."—*C. B. Marks, M. D., Thompsonville village, Benzie county.*

80. "It was brought here from Toledo, Ohio. They visited a school before the period of desquamation was complete."—*S. O. Turbett, M. D., Palmyra township, Lenawee county.*

80. "By a visiting case from West Toledo before desquamation was over."—*K. K. Harrison, M. D., Erie township, Monroe county.*

81. "A family moved into the township from Northern Wisconsin. One child was just desquamating when they came."—*Jas. B. Gaston, M. D., Felch township, Dickinson county.*

82. "First case contracted the disease by contact with cases at Green Bay, Wis."—*M. F. Dockery, M. D., Sagola township, Dickinson county.*

Outbreaks Probably Traced to Former Outbreaks.

83. "Supposed to come from Bay City."—*W. B. Abbott, M. D., Pinconning village, Bay county.*

84. "First case supposed to be at school. A girl from township was taken sick or broke out on Sunday, was at school on Friday. First case sick in village nine days afterwards."—*R. Fraser, M. D., Sherwood village, Branch county.*

85. "By exposure from cases occurring in Athens township as near as could be ascertained."—*John I. Baker, M. D., LeRoy township, Calhoun county.*

86. "Supposed, Calvin township."—*E. A. Planck, M. D., Porter township, Cass county.*

87. "Thought to be from Dowagiac."—*Samuel Stevens, M. D., Keeler township, Van Buren county.*

88. "So far as I can learn, it was carried from the village (Tp.) of Detour, about forty miles distant, where I first learned of outbreak in this county."—*D. H. Webster, M. D., Pickford township, Chippewa county.*

89. "From St. Johns, Mich., I think."—*H. N. Swaney, M. D., Eagle township, Clinton county.*

90. "Bellevue, supposed."—*J. S. Newland, M. D., Walton township, Eaton county.*

91. "Supposed to have contracted it while visiting at Flint."—*L. A. Steele, M. D., Flushing village, Genesee county.*

* Third locality infected from second, shown in Table 8.

92. "Possibly from a case in Flint township."—*A. B. Clark, M. D., Clayton township, Genesee county.*

93. "A young man from Linden attending school here was the first to come down with the disease. He does not know where he was exposed."—*D. A Titus, M. D., Fenton village, Genesee county.*

94. "From exposure in Ithaca, Mich., I think."—*J. F. Suydam, M. D., Arcade township, Gratiot county.*

95. "Probably carried from New Haven township where the disease was prevalent at that time."—*F. Taylor, M. D., Fulton township, Gratiot county.*

96. "Think it was contracted in Perrinton village."—*Geo. C. Young, M. D., Maple Rapids village, Clinton county.*

96. "Must have been from Maple Rapids, but do not know how or where they were exposed."—*Geo. C. Young, M. D., Essex township,* Clinton county.*

96. "Probably carried from Clinton county. Patient attended a party at a neighbor's and a girl from Maple Rapids, who was there, was taken sick with scarlet fever a few days later."—*F. Taylor, M. D., Fulton township,* Gratiot county.*

97. "Supposed to have been contracted in the city of Lansing."—*Albert D. Pollok, Wheatfield township, Ingham county.*

98. "Taken from Jackson county, so supposed."—*R. C. Traver, M. D., Somerset township, Hillsdale county.*

99. "Supposed to be contracted while on a visit to Grand Rapids."—*J. Hunter, M. D., Bowne township, Kent county.*

99. "Grand Rapids probable source of contagium."—*J. K. Hanna, M. D., Gaines township, Kent county.*

100. "Believe it was carried from Dryden township."—*Frank Bailey, Pres. Vil., Leonard village, Oakland county.*

101. "Supposed to have been brought from Douglas township."—*Fred H. Hendricks, McBride village, Montcalm county.*

102. "Was supposed to be from visiting in Greenville where cases had occurred which were at first called scarlet fever, but later were said not to be scarlet fever."—*Geo. M. Spencer, M. D., Grattan township, Kent county.*

103. "Supposed at Clarkston, Mich."—*B. F. Miller, Brandon township, Oakland county.*

104. "The disease came from Oxford, as we believe."—*Erwin Dockham, Deerfield township, Lapeer county.*

105. "It is believed to have been carried in clothing from Saginaw City."—*R. F. Corlett, M. D., Birch Run township, Saginaw county.*

106. "Don't know unless the child was exposed in Marine City."—*J. J. Delbridge, M. D., Algonac village, St. Clair county.*

107. "It is supposed the patient contracted the disease while visiting in Mendon, St. Joseph Co."—*James Nesbitt, Prairie Ronde township, Kalamazoo county.*

108. "Probably from Sturgis."—*C. D. Parsons, M. D., Burr Oak village, St. Joseph county.*

109. "Not definitely known, but, undoubtedly, came from Paw Paw [township]."—*Albert S. Haskins, M. D., Lawrence township, Van Buren county.*

110. "Thought to have been exposed while attending Summer Institute at South Haven."—*H. C. Maynard, M. D., Hartford township, Van Buren county.*

111. "These parties had been to Ann Arbor and we supposed took the disease there."—*A. L. Walker, M. D., Salem township, Washtenaw county.*

112. "Were visiting with a family who came from Detroit, but could not find out if they had had the disease."—*J. W. Flynn, M. D., Warren village, Macomb county.*

112. "Believed to have been contracted in Detroit."—*Will H. Gowan, M. D., Yale village, St. Clair county.*

112. "I believe the disease was contracted in Detroit."—*Hiram Holden, M. D., Monguagon township, Wayne county.*

113. "Believe from the vicinity of Cadillac."—*B. M. Porter, M. D., Centreville village, St. Joseph county.*

Outbreaks in Michigan Probably Traced to Outbreaks Outside the State.

114. "Supposed to be a letter from Canada."—*A. S. McEntee, Capac village, St. Clair county.*

115. "From contact with child of a family recently moved from Illinois to this neighborhood."—*W. F. Wilson, acting health officer, Hanover township, Jackson county.*

* Third locality probably infected from second, shown in Table 8.

116. "Probably from parties visiting in the city from Marion, Ind."—*Jno. D. Greenamyer, M. D., Niles city, Berrien county.*

117. "Supposed to have been brought from South Bend, Ind."—*Robert Dool, Jefferson township, Cass county.*

118. "Think it was brought by visitor where child had scarlet fever in Ohio some time ago."—*Earl Fairbanks, M. D., Luther village, Lake county.*

NEGLECT OF MEASURES TO RESTRICT SCARLET FEVER, VIOLATION OF PUBLIC-HEALTH LAWS, ETC.

Outbreaks of Scarlet Fever in Otisco township, Ionia County.

Dr. Wm. Bell, the health officer of Otisco township, Ionia county, reported two outbreaks of scarlet fever in his jurisdiction. In the first, the source of contagium of which is not known, extending from June 23, to Aug. 16, there were but two cases. Dr. Bell reported that the first case, a child, during the stage of convalescence, while having a very sore mouth, habitually drank from a certain well and cup. A child living across the road, stole away from home and drank out of the same cup. The houses were disinfected, but the isolation was not complete, as Dr. Bell reported that the patients were isolated only from the public, and the father, in both instances, was allowed to go to his daily work.

In the second outbreak, which commenced Aug. 10, 1894, and ended Feb. 25, 1895, Dr. Bell reported that there were 30 cases and 20 of these were traced to a former case. In regard to the source of contagium of this outbreak, he reported that a "child from Grattan, Kent county, who had been ill with some supposed simple rash came visiting while convalescent from the malady, scarcely ten days, and went about visiting at will," and that the disease was further spread by one mild case being concealed, other children in the family attending school, causing several cases. Dr. Bell also reported that in "reliable families" the success attending restrictive measures used was complete, and, after closing the school, Dec. 6, for ten days, and disinfecting the rooms and furniture, there was no further trouble.

Outbreak of Scarlet Fever in Aurelius Township, Ingham County.

An outbreak of scarlet fever in Aurelius township, Ingham county, was reported by the health officer, Dr. Geo. W. Swartwout, to have been caused by a child visiting there from Vevay, who had the disease which was not recognized as scarlet fever. There were 17 cases reported in this outbreak, 10 of which were traced to a former case. In reply to the question as to the exceptions there were to the complete accomplishment of restrictive measures, Dr. Swartwout reported that the first three cases were up and about before he knew of them, these children having had what the parents supposed was scarlet rash and also supposed was not dangerous, had no physician and had not reported it. Also, that in one house, because of another member of the family being sick at the same time with some chronic disease, the only attempt made to disinfect was to spray the rooms of the scarlet fever patient with carbolic acid.

Outbreak of Scarlet Fever in Sturgis Village, St. Joseph County.

Dr. S. B. Follett, health officer of Sturgis village, St. Joseph county, reported an outbreak of scarlet fever in his jurisdiction to have been due to the use of clothes from former cases. In this outbreak, extending from January 23 to July 12, there were reported to have been 40 cases and 2 deaths. Dr. Follett reported 16 cases traced to a former case and attributed this spread of the disease to the fact that the disease was in so mild a form that several cases were not detected by the family until others of the same family came down with it. That after the cases were reported none except members of the same family were exposed, and in these instances only where the house-room was too limited to permit complete isolation and fumigation.

Outbreak of Scarlet Fever in Westphalia Township, Clinton County.

In an outbreak of scarlet fever in Westphalia township, Clinton county, the health officer, Dr. Frank W. Martin, reported all of the 25 cases traced to a former case of the disease. He stated that it was thought to have been brought into the district school by a non-resident child. That some of the children were not very sick and parents did not call a physician. The children would go back to school in a few days and spread the disease still further. He further reported that no report was made to him until nearly three weeks after the outbreak began, but the evidence of success attending efforts at restriction was, "good after it was begun."

Outbreak of Scarlet Fever in Venice Township, Shiawassee County.

The health officer, Wm. H. White, of Venice township, Shiawassee county, reported 2 cases of scarlet fever in his jurisdiction in Oct., 1894. He attributed the source of contagium of the first case to have been from the family moving into a house in the spring in which there had been a case of scarlet fever the fall preceding. The second case took the disease from the first.

There was an outbreak of 10 cases, in which isolation and disinfection were both neglected, reported in this township, extending from Aug., 1893, to Jan., 1894. This is one of many instances reported, which shows the necessity for thorough disinfection, which not only limits the spread of the disease during the present outbreak, but is of equal importance in preventing an outbreak at some future time.

Outbreak of Scarlet Fever in Rome Township, Lenawee County.

Scarlet fever was reported by the health officer, Dr. E. J. Ross, of Rome township, Lenawee county, to have been brought into his jurisdiction by a boy from Colon township, St. Joseph county, who came there visiting. Dr. Ross reported that there were 22 cases in this outbreak, all traced to a previous case. The outbreak extended from Aug. 24, 1894, to Mar. 29, 1895. He also reported that he isolated the first case, but four more cases occurring in the same family it was impossible to isolate them, and that the last case, a young man, went into a quarantined house and contracted the disease. In answer to the question as to the success attending efforts at restriction, Dr. Ross wrote that it was not as satisfactory as could have been wished on account of the disease having been pronounced *tonsillitis.*

Outbreak of Scarlet Fever in Bancroft Village, Shiawassee County.

An outbreak of 30 cases of scarlet fever in Bancroft village, Shiawassee county, was reported by the health officer, T. N. Yeomans, M. D., to have commenced about Nov. 1 (was not reported) and to have ended Dec. 13, 1894. In regard to restrictive measures used, Dr. Yeomans reported that the patient and family were isolated from the public, and, in the same report, he states that a large number were not known about until recovery, and most of them kept in school while peeling. Only 15 pounds of sulphur were burned in this outbreak which was only about one and one-half pounds per thousand cubic feet of air space, and, in a few families, the infected clothing was fumigated.

Outbreak of Scarlet Fever in Frankfort Village, Benzie County.

During an outbreak of 75 cases of scarlet fever in Frankfort village, Benzie county, the health officer, Dr. Hudson J. Kinne, reported that he was having great trouble in enforcing restrictive measures. That in one typical case of scarlet fever, the attending physician called it scarlatina, and ordered the placard, which the health officer had placed on the house, removed, on the ground that scarlatina was not contagious, and children had been allowed to go to school while desquamating. Dr. Kinne stated that he reported the circumstance to the supervisor and to the district attorney, requesting them to prosecute; but no attention was given to the matter. Dr. Kinne placed the case in Secretary Baker's hands and asked for prompt attention to be given to it.

Secretary Baker immediately wrote to Mr. Dwight O. F. Warner, the prosecuting attorney of Benzie county, placing the facts before him, and asking him to at once take such action as would tend to the observance of the public-health laws in Frankfort and the protection of the lives and health of the people of that locality.

The following letter, dated June 23, 1894, was sent by Secretary Baker to the President of Frankfort village:—

"I am informed that scarlet fever is present in your village. That the disease is called 'Scarlatina' and 'Scarlet Rash' by some of the attending physicians who neglect or refuse to report it to the 'health officer the president or the clerk', of the local board of health as required by law. 'Scarlatina', 'Scarlet Rash', and 'Rash Fever' are but other names for scarlet fever, and the same precaution should be taken to prevent their spread as if the diseases were called scarlet fever. I am informed that in one instance in your village, the placard was torn down after having been placed on the premises by the health officer, because the attending physician called the disease 'Scarlatina' and informed the householder that it was not communicable. Any one who disobeys the orders of the health officer, made in accordance with the law, or removes a placard without his permission, is liable to a penalty under section 2, of Act 137, Laws of 1883, and it is the duty of the prosecuting attorney to prosecute for any forfeiture within his county. See section 8442, Howell's Statutes. I am also informed that the prosecuting attorney has been informed of the illegal removal of the placard in the instance referred to, and that he has neglected to take action as required by law.

"From the information which has reached this office, it would seem as if the health officer of your village has complied with the requirements of the law so far as they relate to *his* duties, and the responsibility for the further spread of the disease rests with your board of health and the prosecuting attorney of your county, and I trust that you, as the president of the local board of health, will cause action to be taken at once, for the protection of the lives and health of the people of your locality. Frankfort, situated upon the lake shore, and being a port of entry for vessels from Chicago, where small-pox is unusually prevalent at this time, would seem to require that your board of health should not allow any lax observance of the public-health laws. But scarlet fever is a more difficult disease to restrict than small-pox is.

"I enclose herewith, pamphlets marked, bearing upon the subject under consideration, and I would be pleased to learn from you just what is being done to prevent the spread of scarlet fever, and for the protection of your people."

June 29, 1894, the following reply was received at this Office from Mr. D. B. Butler, the president of Frankfort village:—

"On my return from Chicago to-day I found your letter of 23rd inst., relative to scarlet fever, etc., awaiting me.

"The statement made to you by Dr. Kinne (I suppose) our health officer, is substantially correct. Our people and most of our village council are very indifferent on this important matter, and I thank you for the plain letter you have written that I shall lay before them at next Monday's meeting. With an indifferent board and prosecuting attorney my hands are somewhat tied, and I shall be very glad for any suggestions you may be pleased to give me. The only thing I can do, as far as I know, is to show them your letter and try to *stir* the board up to defensive action."

In a letter attached to his final report of this outbreak, dated July 14, Dr. Kinne wrote that he only reported in regard to the 16 cases that came under his personal observation. In these, the disinfection was thoroughly carried out, but he traced 8 or 10 to a former case. He further reported that in parts of the town where isolation and strict quarantine were followed, there would be only one case in a block, and, where these rules were not followed, it would spread from family to family. In this letter he also wrote that the disease was spreading quite rapidly until people began to get frightened and became willing to submit to quarantine regulations, and from that time they had no trouble in preventing the continuance of the epidemic.

This last statement is probably true of many localities; and if so it may explain the reason why restrictive measures seem to have more influence in lessening the extent of epidemics than in lessening the disease in non-epidemic years. Something like this is apparent by Diagram 1, accompanying Table 4, on a preceding page.* But especially does this seem to be the fact when one examines a "curve" or rather a line representing mortality from scarlet fever during a long series of years before restrictive measures have been enforced, and compares its periodical high death-rates with the more uniform line representing the course of the disease after restrictive measures have been put in operation. In a diagram facing page 252, Report of the Department of Health of Chicago, Illinois, for the year 1894, is such a line, representing the death-rate from scarlet fever from 1851 to 1894 inclusive, showing a marked reduction after the State Board of Health of Illinois began its work for the restriction of scarlet fever in 1883, and especially showing a reduction of deaths in epidemics of scarlet fever.

Outbreak of Scarlet Fever in Detour Township, Chippewa County.

In an outbreak of scarlet fever in Detour township, Chippewa county, the health officer, W. B. House, M. D., reported that there were 84 cases and 13 deaths, of which 13 cases and 1 death occurred in December, 1894, the outbreak not ending until May 23, 1895.

All except the first case were traced to a previous case. Dr. House reported that the disease broke out in a family of 12 children about Dec. 10, five of whom had it before it was recognized by the family as anything

* Diagram 1 is printed on page 171, and Table 4 is printed on page 180, of this Report.

erious. Three of these were attending school while having it. On Dec. 5, he was called to see one of them. She was at the point of death and ied the following day. He could learn of no definite source of contaium, as the disease " existed around there and in Canada across the iver."

In regard to restrictive measures used, and the success attending such fforts, Dr. House reported that each new case was isolated as well as circumstances would allow, which in some cases amounted to nothing so far s the rest of the family were concerned, and, as far as possible, all famlies were isolated. But the great trouble was that the disease gained uch foothold on the start, before recognized; and the people were indiferent and careless. Disinfection was thoroughly carried out, and he eports that the funerals were conducted privately, as directed by the tate Board of Health.

Scarlet Fever in Plainfield Township, Kent County.

There were two outbreaks of scarlet fever in Plainfield township, Kent ounty. The first was reported by the health officer, Dr. Wm. Hyser, to ave extended from Jan. 24, to Feb. 12, 1894, and to have been confined o seven cases in one household. The source of contagium supposed to ave been from the clothes of a man from another township, having the isease in his family, who came to the door of this house, which was four iiles from any infected district. There was a neglected outbreak of scart fever in this township, however, reported in 1893, extending from Nov. o December 23, of that year, the source of contagium of which was eported to have been from Grand Rapids. An outbreak in Rockford vilge about this time, which did not end until March 7, 1894, was reported o have come from this outbreak in Plainfield; and, also, in March one ase in Cannon township. From Rockford village the disease spread to edar Springs village and Courtland township.

These outbreaks being the result of failure to isolate mild cases of the isease in the first instance.

A later outbreak, in Plainfield township, of 60 cases, extending from lay 20 to Nov. 14, 1894, was reported by Dr. Hyser to have come from rand Rapids. He reported that a girl came home from Grand Rapids ith scarlatina which was not recognized and others were exposed. In gard to restrictive measures used in this outbreak he reports such easures in only 8 cases out of the 60.

utbreak of Scarlet Fever in Bennington Township, Shiawassee County.

In a report for the week ending Dec. 8, 1984, received at this office om John Boyd, health officer of New Haven township, Shiawassee ounty, it was stated that there was an exposure in Bennington township om a case of scarlet fever in his jurisdiction. On Dec 13, a " blue " tter, with a postscript stating the information received from Mr. Boyd, as sent to Dr. Chas. E. Shickle, health officer of Bennington township. ec. 21, an outbreak report giving one case of scarlet fever, taken sick n Nov. 10, the source of contagium of which was stated as "not known", id the following letter from Dr. Shickle was received at this Office:—

"Inclosed I send you final report of outbreak of typhoid fever and also report of scarlet fever. The scarlet fever case was unknown to me prior to receiving your letter of Dec. 13. The attending physician, Dr. ———, did not report the same to me. At a meeting of the Township Board of Health the question was raised that the health officer should be paid for disinfecting houses, etc., by those owning the premises and not by township. I have searched my pamphlets of instruction and can not satisfy myself that such is the case. Please send me the proper solution of same stating which should pay the health officer, and oblige."

Secretary Baker sent the following reply, Dec. 21, to Dr. Shickle:—

"Accept thanks for your letter of Dec. 20, relative to typhoid and scarlet fever.

"Relative to the local board of health requiring the householder to pay for disinfecting his premises, after sickness in his family from dangerous communicable diseases, I do not think that that can be done legally. *The disinfection is for the public safety*, and the public should pay for it. The law requires the health officer to disinfect, which would seem to imply that the health officer must supply the disinfectants, and that the public* must pay him for his services and for the disinfectants which he uses."

Dr. Shickle sent in his final report of this outbreak, Feb. 1, 1895, in which he again reported that he knew nothing of the case until he received notice from this Office, that he then investigated and disinfected. He reported that the patient died, and that the remains were embalmed and the funeral conducted in the ordinary way so far as he could determine. A postal card from him gave the date of the death, Nov. 15. If there was a case resulting from the exposure to the case in New Haven township, none was reported. But the fact that there could have been a fatal case of scarlet fever in Bennington township, and the health officer have no knowledge of it until a month later, when information from this Office stirred him up to investigate, shows great negligence on the part of the householder and the attending physician.

Scarlet Fever Spread by Neglect to Isolate Mild Cases.

An outbreak of scarlet fever began in Mt. Pleasant city, Isabella county, in Jan., 1894, and owing to the neglect to isolate mild cases of the disease the outbreak continued through the year, ending Jan. 5, 1895. There were 150 cases reported in this time. In August, the health officer, Dr. Chas. D. Pullen, wrote that the disease was in so mild a form that very few called a physician and the children were allowed to run at large, but where a doctor was called the patient was isolated and the house placarded.

Scarlet Fever Spread by Neglect of Physician to Report Promptly.

In an outbreak of 80 cases of scarlet fever in Marine City, St. Clair county, the health officer, C. W. Shaver, M. D, reported that 21 cases were traced to a former case, and he believed that half of the cases resulted from the neglect of physicians to report promptly, thus alowing others to become exposed before isolation could be effected. In his final report of this outbreak he reports in regard to only 37 cases, and that all of these were isolated from all others except occupants of the same house.

"*Township, in this case, or possibly the county. See Section 1647, Howell's Statutes, page 8 of the pamphlet [120] which I send you herewith."

Outbreak of Scarlet Fever at Holly Village, Oakland County, and a Report of an Investigation for by State.

On Jan. 17, 1894, complaint was received at this Office that there were several cases of scarlet fever in Holly village, Oakland county, and that little or no effort was being made to restrict the disease, that members of the families in which the disease was present were being allowed in the streets, paying no attention to the people's urgent request for them to stay in.

On receipt of this complaint, Secretary Baker immediately sent a "blue" letter to Dr. D. D. Bartholomew, the health officer of Holly village, and, also, wrote him that such information had been received, called his attention to the law relative to the subject, and urged that steps be taken at once to restrict the spread of the disease. In reply, Dr. Bartholomew wrote that they were having a few cases of eruption of the skin among children, perhaps six or seven all told, and that he did not think that "many would feel like calling it scarlet fever, that is, many among the physicians," and, also, that due precautions were being taken.

Upon receiving further complaint of the neglect and consequent spread of this disease, and an urgent request for an expert to be sent there to investigate the matter, Secretary Baker telegraphed Dr. J. W. Hauxhurst, of Bay City, to go to Holly and investigate for the State. The following report from Dr. Hauxhurst was received at this Office, Feb. 3, 1894:—

"In response to your telegram of Jan. 24, I went to Holly the following day, and made as thorough investigation of the outbreak of scarlet fever, in that town, as I could well do under the circumstances.

"Dr. D. D. Bartholomew, president of the village, and its health officer also, was out of town, and would not return for the day.

"This circumstance handicapped me for the start in the direction of a thorough collection of evidence bearing on the alleged outbreak, for the assistance of these officials, although in this instance two officers in one person, would apparently have placed more local authority on the investigation, and enabled me better to understand what is really Holly's protection against the invasion of contagious diseases.

"The persons interviewed, and from whom the knowledge embodied in this report was obtained, were James Slocum, editor of the county paper, Doctors D. W. C. Wade, C. P. Felshaw, G. F. Hunter, and clerk of the local board of health, F. S. Beebe.

"The facts given by the physicians, as to the presence of scarlet fever in the village, and the testimony of Clerk Beebe, as to how the local health officer performs his duties, in his efforts to restrict its spread, with my letter from Dr. Bartholomew, may be considered only as essential in this report.

"Dr. Wade had just ordered final antiseptic cleaning of his patient, and disinfection of the house in which she lived, in a recent case of scarlet fever in his own practice. The placard was yet upon the house. His professional reputation is sufficient to stamp his statement with authority. Dr. Felshaw had treated several cases, three of whom, in the Hudson family, were yet under his care. I saw these cases. The stage of desquamation had well begun in the first of the three, and was well marked on the palmar surface of the fingers, on the back of the wrists, and on the neck.

"The second still displayed the rash. The mother was just beginning to be sick, and had the typical scarlet fever redness and soreness of the throat. A placard was on this house, but the father, who is a cooper, was away working at his shop. Dr. Hunter said he had treated several cases of scarlet fever during this outbreak.

"Mr. Beebe said he thought the health officer was doing all the law requires to prevent the spread of the disease, but could not go into detail. The president of the local board * * * resides in the country. I did not see him.

"It can not be truthfully denied that scarlet fever prevails in the village of Holly.

"Dr. Bartholomew places emphasis on his statement that most cases having the alleged disease remain in bed only one day.

"He says in his letter to me that he has 'seen more cases than any other physician in Holly, and none have had any desquamation.' It would be interesting to know if he has endeavored to follow his cases to that stage.

"While in Holly, I addressed a letter to him there, asking him questions concerning his understanding of the disease, and what his views were in reference to restrictive measures against it; for I thought I would not then be trying an accused without a hearing, and I felt that my request would seem more complete and impartial with this information.

"But inasmuch as he has wholly ignored my questions, I am left to draw my conclusions as to the character of his professional and official duties from his letter, as it is, and which is herewith enclosed.

"The printed instructions on the nature and management of contagious diseases, which you mailed to me at Holly, were placed in the hands of Mr. Beebe, and he assured me he would carefully read them, and endeavor to comply with their teachings.

"It may safely be believed that the 'commotion,' of which Dr. Bartholomew speaks, will result in waking up the citizens of Holly to the fact that the State has made provision for the safety and protection, in epidemics of contagious diseases, and that it is optional with them whether they will intelligently and voluntarily make application of the rules and means given them to stamp out the present one."

The following letter from Dr. Bartholomew to Dr. Hauxhurst was enclosed in Dr. Hauxhurst's report:—

"On my return from Saginaw I received yours of the 25th inst. In reply will say that all this commotion has had its origin in some such officious person as the remarkable personage —— ——. Now I will say that all cases that have occurred during this great scare have not been confined to their beds more than one day. I have seen more cases of it than any other physician in Holly and none have had any desquamation. All cases that have been reported to me as scarlet fever by physicians I have taken especial pains to see that the houses were marked with the proper card, and the family quarantined. Now please do not give yourself any extra uneasiness about contagious diseases when reported to you by some unauthorized person for I give you my word that whenever any disease of contagious nature breaks out in this village or township, the state board of health will have due, and timely notice so long as I am its health officer."

March 28, 1894, a final report of this outbreak was received from Dr. Bartholomew, in which he reports 16 cases, all isolated from all persons except the nurses and physician, and that the families were quarantined and people kept away from them, and all the rooms were disinfected with fumes of burning sulphur, but he does not state how much sulphur was used.

What shall be done when the Health Officer and Physicians Disagree as to the Necessity for Restrictive Measures.

Information is often asked of this Office in regard to what should be done in case of disagreement between the local health officer and the attending physician, as to the diagnosis of the case, and as to the necessity for restrictive measures, and the length of time of quarantine.

The following letter from the Secretary of the State Board of Health, written to Dr. D. H. Wood, of Coldwater city, and the following paragraphs from a letter to Dr. R. B. Baird of Marine City, were designed to answer these questions:—

"In response to your letter of May 5, relative to certain resolutions (copies of which were enclosed with your letter) passed by the board of health of the city of Coldwater,—

"You ask, 'Is it the province of the health officer, after a physician has reported a case of contagious disease as required by the statutes, to go and examine the patient and contradict the diagnosis of the physician in attendance?'—No. This board has voted, 'That it is the opinion of this State Board that when a case of a dangerous communicable disease is reported by a reliable physician, the health officer should act upon the diagnosis of such physician without question.'

"Section 1, of Act 137, Laws of 1883, requires the health officer to take action when he shall receive reliable notice, or shall otherwise have good reason to believe that there is within his jurisdiction, a 'disease dangerous to the public health', (unless he has been directed by his board of health 'to do otherwise'.)

Upon receiving such 'reliable notice' he is required 'immediately to investigate the subject', and take prompt action to prevent the spread of the disease. I do *not* think that 'immediately to investigate the subject' means that the health officer is to examine the patient and reject the diagnosis of the attending physician, but implies that when he has 'good reason to believe' from 'hearsay', or when doubtful information reaches him in a roundabout way, he shall ascertain the correctness of such rumors. If the law intended that the health officer should reject the diagnosis of the attending physician, it would be of doubtful utility in townships of this State, where, in many instances, the health officer is *not* a physician. In townships where the health officer is *not* a physician, and the disease has not been reported by a physician, but information has been received through unprofessional sources, he should have the assistance of a physician in his investigation. I believe that the primary meaning of the phrase 'immediately to investigate' is, that the health officer shall without delay, examine the premises where the disease is, ascertain the source of the contagium, if possible, learn just who have been exposed to the disease, ascertain how the sick and infected persons can best be isolated, and gain such other knowledge as will enable him to comply with the other parts of section 1 of Act 137, Laws of 1883.

"This board believes that, when a physician in ordinary practice, reports a case of dangerous communicable disease, it is the duty of the health officer to accept the statement of that physicians that the case is diphtheria, scarlet fever, etc., as the case may be, and to take prompt and vigorous measures to prevent the spread of the disease."

The following paragraphs are from a letter written by Secretary Baker to Dr. R. B. Baird, of Marine City:—

"But when once reported, the health officer, and not the physician, decides when a case shall be liberated.

"The health officer is the executive officer of the local board of health, and is entirely under its control, and if he fails or refuses to comply with its orders, he should be removed and some person appointed who *will* obey its orders.

"The public safety should have the benefit of the doubt in every case. The health officer should not discredit the report of any physician *when such action is not necessary for the public safety.* If a physician has a case of communicable disease and does not report, then it the duty of the health officer to investigate and see that it is isolated."

Is Biniodide of Mercury a Preventive Treatment of Scarlet Fever?

March 24, 1894, Dr. D. Hyndman, health officer of Norvell township, Jackson county, wrote to the Secretary of the State Board, as follows:—

"Some 18 or 20 years ago we had a severe outbreak of scarlet fever here and at Napoleon, four miles distant.

"At Napoleon the deaths ran as high as 6 or 7 a week. We had none; and but one case which lingered at all. Had 25 to 40 cases.

"I used the usual *regular treatment* but *for the throat complications solely* gave rather freely of a saturate of biniodide of mercury.

"Several years afterwards, and once since, I found in one of our medical periodicals an article on the use of the biniodide in scarlatina, claiming to almost abort the disease by its use; certainly, so stated, hastening the peeling stage and recovery. My previous use of it as above was at once recalled and made me much interested in the possible good contained in the remedy. I believe there is some thing in it, and have used it frequently in that connection.

"But now having introduced the subject I come to the matter to which I desire more especially to call your attention in connection with the enclosed weekly report. About eight weeks ago I was called to see a boy of about seven years of age in the family of Mr. C. P. Holmes of this place consisting of the parents, and a sister a few years older than the patient and a brother younger. I learned that there had been an eruption the day before but entirely gone when I saw the case. Other indications pointed to scarlet fever but I was not sure. However we ordered them not to mingle with nor allow others to visit them for over a week in order that the two other children, both fit subjects to contract the disease, might pass the incubation stage before we took any chances. Now with great belief in the red iodide, as above, I gave it to the two who had not had it, thinking possibly to modify at least the severity if they should contract the disease. The boy got well and did not peel at all or but a slight scaling on a part of the abdomen, and, as after about ten days, the others gave no evidence of the disease we concluded our suspicions unfounded and removed our restrictions but did not fumigate nor take any other preventive measures.

"In between six and seven weeks after the above, and without exposure of which we know, and no other cases around here, and they live on a farm a mile out, the other two children are stricken with scarlet fever within twenty-four hours of each other and the incubation stage having passed and the first boy not having any signs we are led to do some theorizing—

"Did the biniodide adjourn the attack? The last two cases are typical in every sense and the parents inform me that since seeing the eruption on the other children it was just like what was on the other boy for so few hours. No need of my enlarging upon the matter for your mind will doubtless run over the ground of speculation or knowledge of the thing. Pardon the length of this communication, but thinking that in your position you might have struck something in the lines thus opened I took the liberty of writing you thus lengthily and will be pleased to know what you think of it."

Secretary Baker gave his opinion, in the following letter to Dr. Hyndman, dated Mar. 26, 1894, as follows:—

"You may be correct in your belief as to the delaying influence of the medicine given, but I am inclined to the belief that the disease being mild in the first child, the *cumulative* influence was required to cause the disease in the two other children, and that the two children contracted the disease after the stage of desquamation in the first was pretty well advanced. This stage is sometimes delayed and not completed before sixty or eighty days."

OUTBREAKS OF SCARLET FEVER IN WHICH ISOLATION AND DISINFECTION WERE ENFORCED.

The following is the substance of a few health officers' statements which are representative of the statements of those health officers whose reports indicated that they had quite carefully enforced isolation and disinfection:—

Regarding restrictive measures used in an outbreak of scarlet fever in the village of East Jordan, Charlevoix county, the health officer, Dr. Frank A. Foster, reported in substance, as follows:—

The patient occupied a special room with as little furnishing as would meet the occasion, and none but the attendants were allowed to enter. The discharges of the patient were disinfected with a strong solution of carbolic acid and buried. The contents of the privy vault were disinfected with two pounds of fresh chloride of lime and sulphate of iron. All infected clothing, bedding, etc., were boiled in a zinc sulphate solution or exposed to fumes of burning sulphur. After the patient recovered, all the rooms of the house were disinfected by fumes of burning sulphur at the rate of two pounds per 1,000 cubic feet of air space.

In regard to the methods used to restrict an outbreak of scarlet fever in Sagola township, Dickinson county, the health officer, Dr. M. F. Dockery reported, subtsantially, as follows:—

Patients were placed in rooms containing no unnecessary furniture, and no one allowed in rooms but the physician and nurse. A sheet moistened with a disinfectant solution was hung outside the door of sick rooms. Patients anointed daily with an antiseptic solution. The discharges of patients were disinfected in 1 to 1,000 solution of corrosive sublimate, and in chloride of lime, four ounces to a gallon, and buried. All infected clothing, bedding, etc., were washed in a solution of corrosive sublimate and left in a room containing burning sulphur, and articles that could not be disinfected were burned. After the outbreak was over all the rooms were disinfected by fumes of burning sulphur at the rate of three pounds per 1,000 feet of space.

In an outbreak of scarlet fever in Essex township, Clinton county, the health officer, Dr. Geo. C. Young, reported two deaths in one household, that no funerals were held, but the undertaker and himself took charge of the remains. In regard to other measures taken to restrict the disease Dr. Young reported, substantially as follows:—

The patients were isolated from all persons except the nurse and the physician. The discharges of the patients were buried. No one was allowed to enter or leave the house until two weeks after the close of the outbreak when everything had been disinfected by fumes of burning sulphur at the rate of three pounds per 1,000 feet of space.

Dr. E. E. Moore, health officer of Hillsdale city, Hillsdale county, reported 22 cases and 1 death in an outbreak of scarlet fever in this city which began, Mar. 15, and ended, May 20, 1894. In regard to restrictive measures used, he reported in substance, as follows:—

Closed the public school, kept children from public gatherings, and quarantined every case. Confined patients with nurse and mother to upper rooms. The discharges of patients were disinfected by carbolic acid and Platt's chlorides and buried. All infected clothing, bedding, etc., were disinfected as required by the leaflets sent from the State Board of Health Office. At the close of the outbreak, all the houses were disinfected by fumes of burning sulphur at the rate of three pounds per 1,000 cubic feet of space.

In an outbreak of scarlet fever in Cassopolis village, Cass county, the health officer, Dr. Thomas W. Anderson, reported that the patient was exposed to the disease while at Traverse City, that this was the only case that occurred in this outbreak, and that two children in the family escaped. Concerning restrictive measures used, he reported, in substance, as follows:

The child was isolated from all persons except the nurse and physician. The carpets and unnecessary articles were removed from the room. The discharges of the patient and contents of the privy vault were disinfected by chloride of lime. After the patient recovered, all infected clothing, bedding, etc., were disinfected by fumes of burning sulphur at the rate of five and one-half pounds per 1,000 cubic feet of air space.

Concerning an outbreak of scarlet fever in Porter township, Cass county, the health officer, Dr. Edgar A. Planck, reported, substantially, as follows:

The patient was isolated from all except nurse and physician. The discharges of the patient were disinfected and covered with earth. All infected clothing, bedding, etc., were washed and boiled. Two rooms and privy were disinfected by fumes of burning sulphur at the rate of two pounds per [1,000] cubic feet of space. Two other children in the family did not contract the disease.

May the Attending Physician Disinfect, or must it be done by the Health Officer?

Dr. Isabel R. Copp, attending physician in a case of scarlet fever in Leelanaw township, Leelanaw county, asked the above question of Secretary Baker, who sent the following letter in reply:

"Yes; the law requires the health officer to do the disinfecting, *provided* he has not been instructed by the local board of health '*to do otherwise.*' (See section 1, of Act 137, Laws of 1883, page 3 of pamphlet [120] sent you by this mail.)

"If you will disinfect the premises, rooms, clothing, etc., as directed in our pamphlet on the restriction and prevention of scarlet fever, it may be that the health officer will be satisfied with the work, or that the local board of health will instruct him '*to do otherwise*' than do it himself. If this is done, I trust that you will see that nothing whatever is left infected."

ESTIMATED NUMBER OF CASES OF SCARLET FEVER PREVENTED AND NUMBER OF LIVES SAVED BY ISOLATION AND DISINFECTION.

Tables 9 and 10 and the following diagram compare the average numbers of cases and deaths in outbreaks of scarlet fever where the measures of isolation and disinfection, prescribed by the Michigan State Board of Health, were enforced, with the average numbers of cases and deaths in those outbreaks where those measures were neglected.* By Table 10 it may be seen that during the eight years, 1887–94 there were over five times as many cases, and nearly five times as many deaths in those outbreaks in which these measures were neglected as in those outbreaks in which they were enforced.

By Table 9 it may be seen that during the year 1894 there were reported to the office of the State Board of Health 662 outbreaks of scarlet fever, with 4,349 cases and 175 deaths. Had no efforts at restriction been made, and had the average numbers of cases and deaths per outbreak remained the same as in the column headed "Isolation and Disinfection both Neglected," there would have occurred 8,606 cases and 265 deaths, and taking from these respectively the cases (4,349) and deaths (175) which did occur, leaves 4,257 cases and 90 deaths indicated as prevented in these 662 outbreaks, by isolation and disinfection. By the same method for each year, the indicated saving in the 4,086 outbreaks which occurred during the eight years 1887–94, is 24,747 cases and 888 lives. This is shown in Table 10.

* Definition of the term, "Outbreak": An outbreak is considered as the existence of one or more cases of a particular communicable disease within any health officer's jurisdiction, whether city, village, or township. All cases of the disease occurring within the jurisdiction during the outbreak are considered as part of the outbreak, unless the contagium cannot be traced to cases within the jurisdiction, and can be clearly traced to cases outside of the jurisdiction, in which instance they are considered as constituting a separate outbreak. When a period of 60 days or over has elapsed since the last case (in a given jurisdiction) died or recovered, the outbreak has been considered ended.

In the compilation of the reports for Tables 9 and 10 and the diagram showing the results obtained by isolation and disinfection, every effort has been made to place the numbers of cases and deaths in each outbreak in the proper columns. If, for instance, there were only one or two cases in an outbreak and the health officer neglected to isolate or disinfect, but for some reason the disease spread no further, the numbers of cases and deaths were placed in the column headed "Isolation and Disinfection both Neglected." If, on the other hand, as often occurs, quite a number of persons are exposed at the same time and place outside the health officer's jurisdiction, and by proper isolation and disinfection he succeeds in confining the disease to the original cases exposed, they are placed in the column headed "Isolation and Disinfection Enforced." If, however, he neglects to properly isolate or disinfect, the whole number of these cases and deaths are placed in the "neglected" column. It is to be regretted that many of the reports received at this office do not state exactly what was done to restrict the disease, or are not sufficiently definite to enable the compilers to decide just what was done, and they are obliged to place all such in the column headed "Isolation or Disinfection or both not mentioned, or statements doubtful."

TABLE 9.—*Scarlet Fever in Michigan in 1894; Exhibiting the Average Numbers of Cases and Deaths per Outbreak:—(1) in all the 662 outbreaks reported; (2) in the 378 outbreaks in which it is doubtful whether or not Disinfection or Isolation was enforced; (3) in the 14 outbreaks in which Disinfection was enforced and Isolation was doubtful; (4) in the 41 outbreaks in which Isolation was enforced and Disinfection was doubtful; (5) in the 24 outbreaks in which Isolation was enforced and Disinfection was neglected; (6) in the 27 outbreaks in which Disinfection was enforced and Isolation was neglected; (7) in the 104 outbreaks in which both Isolation and Disinfection were neglected; (8) in the 74 outbreaks in which both Isolation and Disinfection were enforced.*

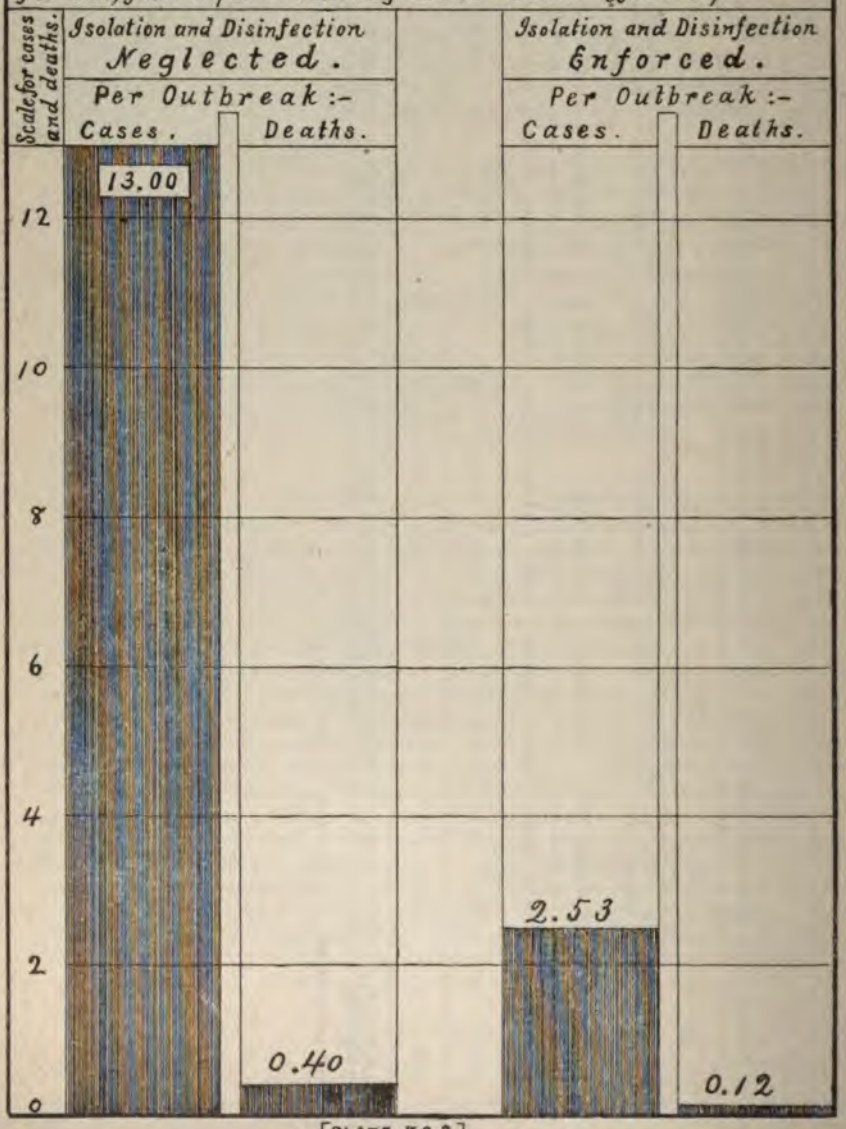
	(1) All outbreaks. (662 outbreaks.*)		(2) Isolation or Disinfection or both not mentioned, or statements doubtful. (378 outbreaks)		(3) Disinfection enforced—Isolation doubtful. (14 outbreaks.)		(4) Isolation enforced—Disinfection doubtful. (41 outbreaks.)		(5) Isolation enforced—Disinfection neglected. (24 outbreaks.)		(6) Disinfection enforced—Isolation neglected. (27 outbreaks.)		(7) Isolation and Disinfection both neglected. (104 outbreaks.)		(8) Isolation and Disinfection both enforced. (74 outbreaks.)	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals....	4,349	175	2,376	93	42	1	93	5	94	2	209	21	1,343	43	187	9
Averages..	6.57	.26	6.29	.25	3	.07	2.27	.12	3.92	.83	7.74	.78	†13	†.40	†2.53	†.12

* These do not include the cases and deaths in Detroit, Grand Rapids, Alpena, Flint, Kalamazoo, Ishpeming, Saginaw and St. Clair, because of the difficulty in determining the beginning and ending of an outbreak in these cities, in which the disease was present in some part of the city nearly all the time. See foot-note to Table 10.

† These figures are graphically represented in the diagram on page 266.

ISOLATION AND DISINFECTION RESTRICT SCARLET FEVER.

Scarlet Fever in Michigan in 1894:- Exhibiting the average numbers of cases and deaths per outbreak:- in all outbreaks in which Isolation and Disinfection were both Neglected: and in all outbreaks in which both were Enforced. (compiled in the office of the Secretary of the State Board of Health, from reports made by local Health Officers.)



[PLATE 823]

This diagram graphically represents the lower line of figures in the last four columns of Table 9.

TABLE 10.—*Exhibiting for the eight years, and for each of the eight years 1887-94, the numbers of Reported Outbreaks, Cases and Deaths; also for this eight-year Period, the average numbers of Cases and Deaths per Outbreak in all outbreaks; in those Outbreaks in which Isolation or Disinfection or both were Doubtful; Isolation and Disinfection both Neglected; Isolation and Disinfection both Enforced; and, also, the Numbers of Cases and Deaths Indicated as having been prevented by Isolation and Disinfection.*

Years.	All Outbreaks.*			Isolation or Disinfection, or both, not Mentioned, or Statements Doubtful.			Isolation *and* Disinfection, both Neglected.			Isolation and Disinfection both Enforced.			Cases and Deaths Indicated as having been Prevented by Isolation and Disinfection.	
	Outbreaks.	Cases.	Deaths.	Outbreaks.	Cases.	Deaths.	Outbreaks.	Cases.	Deaths.	Outbreaks.	Cases.	Deaths.	Cases.	Deaths.
1887	299	1,882	141	190	1,200	93	32	440	34	64	148	11	† 2,220	† 177
1888	340	1,538	112	225	955	74	61	724	33	36	80	3	† 2,198	† 72
1889	417	2,822	123	284	1,453	61	73	1,208	48	52	140	10	† 4,175	† 156
1890	477	3,054	115	303	1,711	67	94	1,187	36	42	76	1	† 3,715	† 66
1891	602	4,236	193	380	3,013	91	141	1,704	66	42	107	1	† 3,342	† 90
1892	622	5,240	306	377	2,944	186	110	1,621	59	42	97	7	† 3,928	† 30
1893	667	5,219	327	387	3,197	204	124	1,511	99	60	157	8	† 2,912	† 207
1894	662	4,349	175	378	2,366	93	104	1,348	42	74	187	9	† 4,257	† 90
Totals	4,066	29,340	1,492	2,523	16,888	871	738	9,698	417	412	992	50	{‡24,747 {24,309	‡ 888 } 837 }
Averages, eight years	511	3,668	187	315	2,105	109	92	1,212	52	52	124	6	3,093	111
Average cases and deaths per outbreak for eight years, 1887-94		7.18	.37		6.67	.35		13.13	.57		2.41	.12		

* Outbreaks in Detroit and Grand Rapids are not included in the years 1887-94 inclusive, and for the year 1894 outbreaks in Alpena, Flint, Kalamazoo, Ishpeming, Saginaw and St. Clair, are not included because of the difficulty in determining the beginning and ending of an outbreak in these cities, in which the disease was present in some part of the city nearly all the year. † The numbers of cases and deaths in this double column are found by multiplying "all outbreaks" for each year by the average numbers of cases or deaths per outbreak, in those outbreaks in which isolation and disinfection were both neglected, for that year, and deducting from the results thus obtained, the cases or deaths, as the case may be, which were reported to have occurred that year. ‡ The two sets of numbers appearing in this column are based on two distinct methods of solution which are explained as follows:—(1) The 24,747 cases and 888 deaths are totals of the columns representing cases and deaths saved as explained in the † foot-note, (2) the 24,309 cases and 837 deaths are obtained by multiplying the average numbers of cases and deaths per outbreak for the eight years, 1887-94, (13.13 and .57, where isolation and disinfection were neglected) by the total number of outbreaks, to find the numbers which would have occurred if all outbreaks had been neglected, and subtracting therefrom the numbers of cases and deaths that were reported as having occurred during the eight-year period.

PERIOD OF INCUBATION, IN SCARLET FEVER.

TABLE 11.—*Exhibiting the reported Period of Incubation, stated in days, in 208 instances of Scarlet Fever. Compiled from reports of Health Officers in Michigan, for the year, 1894.*

Incubation period—Days	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	17	18	21	25	28	42
Instances in each period..	2	*19	†13	14	‡14	§20	¶34	‖11	**18	††23	5	3	2	‡‡18	§§1	1	1	¶¶5	1	1	1

* In 1 of these instances it was reported as about 2 days.
† In 2 of these instances it was reported as about 3 days.
‡ In 7 of these instances it was reported as about 5 days.
§ In 1 of these instances it was reported as about 6 days.
¶ In 9 of these instances it was reported as about 7 days.
‖ In 2 of these instances it was reported as about 8 days.
** In 7 of these instances it was reported as about 9 days.
†† In 5 of these instances it was reported as about 10 days.
‡‡ In 7 of these instances it was reported as about 14 days.
§§ In 1 of these instances it was reported as about 15 days.
¶¶ In 1 of these instances it was reported as about 21 days.

The average period of incubation in the 208 reported instances is 8.1 days; the greatest number of instances given in any single period was in the 7-day period.

TABLE 12.—*Exhibiting, relative to 82 instances of Scarlet Fever in Michigan in 1894, the Reported Period of Incubation, within certain limits, stated in days; also the Means, the Average of which may Represent the Average Period of Incubation.*

Days.	Means.	Days.	Means.	Days.	Means.	Days.	Means.	Days.	Means.
1 to 4	2.5	3 to 4	3.5	4 to 10	7	6 to 10	8	9 to 10	9.5
1 to 5	3	3 to 4	3.5	4 to 10	7	6 to 15	10.5	9 to 10	9.5
1 to 6	3.5	3 to 5	4	4 to 12	8	6 to 21	13.5	9 to 10	9.5
1 to 7	4	3 to 6	4.5	5 to 6	5.5	7 to 8	7.5	9 to 10	9.5
1 to 14	7.5	3 to 7	5	5 to 6	5.5	7 to 10	8.5	9 to 12	10.5
1 to 14	7.5	3 to 7	5	5 to 7	6	7 to 10	8.5	9 to 14	11.5
1 to 21	11	3 to 7	5	5 to 7	6	7 to 10	8.5	9 to 15	12
2 to 3	2.5	3 to 7	5	5 to 7	6	7 to 14	10.5	10 to 14	12
2 to 3	2 5	3 to 8	5.5	5 to 8	6.5	7 to 14	10.5	10 to 20	15
2 to 5	3.5	4 to 5	4.5	5 to 8	6.5	7 to 14	10.5	10 to 30	20
2 to 5	3.5	4 to 5	4.5	5 to 9	7	7 to 21	14	11 to 21	16
2 to 5	3.5	4 to 6	5	5 to 10	7.5	7 to 21	14	13 to 14	13
2 to 6	4	4 to 6	5	5 to 10	7.5	7 to 21	14	13 to 14	13.5
2 to 8	5	4 to 7	5.5	5 to 12	8.5	8 to 9	8.5	14 to 15	14.5
2 to 12	7	4 to 7	5.5	5 to 14	9.5	8 to 10	9	14 to 21	17.5
2 to 20	11	4 to 8	6	6 to 8	7	8 to 10	9	----------	----------
----------	----------	4 to 8	6	6 to 9	7.5	8 to 12	10	----------	----------

The average of all the means, for the 82 instances, is 8 days.

AGES OF GREATEST PREVALENCE OF, AND MORTALITY FROM, SCARLET FEVER.

Methods Employed in Compiling, Relative to Ages.

In compiling data relating to ages, used in tables in this article, when the ages are stated, as they usually are, in full years, the cases or deaths are compiled under the years mentioned. When the ages are stated in months, or years and months, the following method is pursued:—Persons under one year and six months old are classed as aged *one* year. Those over one year and six months and under two years and six months are classed as aged *two* years. Those over two years and six months and under three years and six months are classed as three years of age, and so on for each year.

In dividing the ages into five-year periods, the first period consists of all ages from birth to five years and six months. The second five-year period includes all ages over five years and six months and under ten years and six months. The third five-year period includes all ages over ten years and six months and under fifteen years and six months; and in each succeeding period the same arrangement is followed.

In Table 13 are shown the numbers of cases of, and deaths from scarlet fever in Michigan in 1894, in which the ages were stated in the health officers' reports. In this table the cases and deaths are arranged in *age-groups*, showing what per cent the cases in each group were of all cases; the per cent that the deaths in each group were of all deaths; the per cent the deaths in each group were of the cases in that group, and the per cent the deaths in special groups were of all deaths.

Of the 5,500 cases of scarlet fever reported to this Office for the year 1894, the ages were given in 2,595 instances, and of the 203 deaths reported for the same year, the ages of the decedents were given in 91 instances. As the per cent of deaths per hundred cases is nearly the same in the total numbers reported as in the smaller numbers where the ages were stated (being 3.7 for the total numbers and 3.5 for those where ages were given), evidently those cases and deaths where the ages were stated are fair averages.

By this table (13) it may be seen that the greatest number of cases of scarlet fever occurred in children under 10 years of age,—75 per cent of all cases having occurred in that period of age. Twenty per cent of all cases occurred in the next two age-periods, 10 to 20 years.

The greatest number of deaths occurred in the first five-year period,—71.4 per cent of all deaths having occurred in that age-period. The next greatest number of deaths occurred in the second five-year period, 5 to 10 years, 16.5 per cent of all deaths having occurred in that age-period. Ninety-five per cent of all the cases and ninety-eight per cent of all the deaths, in which the ages were stated, occurred in persons under twenty years of age.

The fourth line of this table shows that with nearly the same number of cases in the first and second five-year periods the fatality in the first five-year period was over four times the fatality in the second age-period. From twenty years of age up to old age the fatality was but 1.6 per cent.

The per cent the cases and deaths in the age-periods were of all the cases and deaths, in which the ages were stated in the health officers' reports, is given also in Table 14. This table (14) also shows the percentages for the same age-periods for each of the years, 1892–94, and for the three years, 1892–94, combined.

TABLE 13.—*Exhibiting in certain Age-Groups, the number of Cases and the number of Deaths from Scarlet Fever; the per cent that the cases in each group were of All Cases; the per cent that the Deaths in each group were of All Deaths; and the per cent that the Deaths in each group were of the Cases in that group.—Compiled from all reports for the year 1894 which stated the ages.*

	Number and per cent of Cases and Deaths in certain Age-groups.†																		
Ages in groups of years.	All ages known.	0-1.	1-2.	2-3.	3-4.	4-5.	0-5.	5-10.	10-15.	15-20.	20-25.	25-30.	30-35.	35-40.	40-45.	45-50.	50-55.	55-60.	Over 60.
No. of cases	* 2,595	114	188	186	213	243	944	999	390	139	47	41	15	10	6	1	1	1	1
Per cent the cases in each group were of all cases	100	4.4	7.2	7.2	8.2	9.4	36.4	38.5	15.0	5.4	1.8	1.6	.6	.4	.2	.04	.04	.04	.04
No. of deaths	* 91	10	21	13	9	12	65	15	5	4	1	1	0	0	0	0	0	0	0
Per cent the deaths in each group were of cases in that group	3.5	8.8	11.2	7.0	4.2	4.8	7.0	1.5	1.3	2.9	2.1	2.4	0	0	0	0	0	0	0
Per cent the deaths in each group were of all deaths	100	11.0	23.1	14.3	10.0	13.2	71.4	16.5	5.5	4.4	1.1	1.1	0	0	0	0	0	0	0
Per cent the deaths in special groups were of all deaths		71.4					88.		10.		2		0						

* Does not include those cases or deaths where the age was not stated.
† The method of grouping is stated in the text preceding this, on page 269.

TABLE 14.—*Exhibiting in certain Age-Groups, the number of Cases and the number of Deaths from Scarlet Fever in the three years and in each of the years 1892-94; the per cent that the Cases in each group were of All Cases; the per cent that the Deaths in each group were of all Deaths.—Compiled from all reports for the years, 1892-94, which stated the ages.*

Year.		Total No. included. †	Per Cent of Cases and Deaths in certain Age-groups.										
			All Ages.	0 to 5.	5 to 10.	10 to 15.	15 to 20.	20 to 25.	25 to 30.	30 to 35.	35 to 40.	40 to 45.	Over 45 years.
1892.	Cases	2,832	100	30.0	41.1	18.4	5.9	2.1	.9	1.0	.4	.1	.1
	Deaths	128	100	48.4	35.9	10.9	1.6	0.8	0	1.6	0	0.8	0
1893.	Cases	2,666	100	38.7	36.6	15.0	5.1	2.0	1.1	0.8	0.4	0.3	0.1
	Deaths	166	100	56.0	27.1	12.0	1.8	1.8	0.6	0	0	0.6	0
1894.	Cases	2,595	100	36.4	38.5	15.0	5.4	1.8	1.6	.6	.4	.2	.2
	Deaths	91	100	71.4	16.5	5.5	4.4	1.1	1.1	0	0	0	0
1892-94.	Cases	8,093	100	34.9	38.8	16.2	5.4	1.9	1.2	.8	.4	.2	.1
	Deaths	385	100	57.1	27.5	10.1	2.3	1.3	.5	.5	0	.5	0

† In this column *cases* include both *fatal* and *non-fatal* cases.

TABLE 15.—*Exhibiting, by Sex, for each year of Age, and in certain Age-groups, the number of persons who died from Scarlet Fever during the year 1894, and the per cent the deaths in each Age-group were of deaths at all ages. (Compiled from such reports to the State Board of Health, as stated the sex and age.)*

Sex.	Ages in Years, and groups of Years.	All ages.	Number and per cent of Deaths by Sex, in certain Age-periods.																					
			0–5.					5–10.					10–15.					15–20.					21 years and Over.	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	25	29
Males.	No. of Deaths, by single Years.		5	11	8	4	2	1	3	2	2	--	--	1	1	--	--	--	--	1	--	--	-----	1
	No. of Deaths, by Groups of Years	42	30					8					2					1					1	
	Per cent the Deaths in each age-group were of the total deaths * among Males		71.4					19.					4.8					2.4					2.4	
	Average age at Death, from Scarlet Fever	5																						
Females.	No. of Deaths, by single Years.		5	10	5	5	10	1	3	--	2	1	2	1	--	--	--	1	1	1	--	--	1	-------
	No. of Deaths, by Groups of Years	49	35					7					3					3					1	
	Per cent the Deaths in each age-group were of the total deaths * among Females		71.4					14.3					6.1					6.1					2.0	
	Average age at Death, from Scarlet Fever	5.6																						
Both Sexes.	No. of Deaths, by single Years.		10	21	13	9	13	2	6	2	4	1	2	2	1	--	--	1	1	2	--	--	1	1
	No. of Deaths, by Groups of Years	91	65					15					5					4					2	
	Per ct. the Deaths in each age-group were of the total deaths* of both sexes		71.4					16.5					5.5					4.4					2.2	
	Average age at Death, from Scarlet Fever	5.3																						

* Deaths from scarlet fever.

From Table 15 it may be seen, that the ages of 42 males and of 49 females who died from scarlet fever in 1894 were given. Of these, the same proportion of males and females died before reaching the sixth year of age, 71.4 per cent of each sex having died in the age-period, from 0 to 5 years inclusive.

The average age of males who died from scarlet fever in 1894, was 5 years; of females, 5.6 years. The average age at which both sexes died was 5.3 years.

TABLE 16.—*Exhibiting, by Sex, the number and per cent of deaths from Scarlet Fever, and the number and per cent of Non-Fatal Cases of Scarlet Fever, in Michigan during the year 1894, arranged in five-year periods; also the average age of the Fatal and Non-Fatal Cases.*

Sex.	1894.	Average age.	All ages.	Periods of years.									
				0 to 5.	5 to 10.	10 to 15.	15 to 20.	20 to 25.	25 to 30.	30 to 35.	35 to 40.	40 to 45.	Over 45 years.
Males.	No. of non-fatal cases	8.2	1,122	423	433	152	63	20	15	5	3	4	2
	Per cent of non-fatal cases in each age-period		100	37.7	38.6	13.6	5.8	1 8	1.3	.4	.3	.4	.2
	No. of fatal cases	5	42	30	8	2	1	0	1	0	0	0	0
	Per cent of fatal cases in each age-period		100	71.4	19.	4.8	2.4	0	2.4	0	0	0	0
Females.	No. of non-fatal cases	8.1	1,382	456	551	233	70	26	25	10	7	2	2
	Per cent of non-fatal cases in each age-period		100	33.	39.9	16.9	5.1	1.9	1.9	.7	.5	.1	.1
	No. of fatal cases	5.6	49	35	7	3	3	1	0	0	0	0	0
	Per cent of fatal cases in each age-period		100	71.4	14.3	6.1	6.1	2.	0	0	0	0	0

From Table 16 it may be seen that of the 1,122 males reported to have recovered from scarlet fever in 1894, whose ages were given, 90 per cent were sick before reaching the age of 16 years; and of the 1,382 females, whose ages were given, 89.7 per cent were sick before reaching the same age; that the average age of males who recovered from scarlet fever was 8.2 years and for females was 8.1 years.

Of the males who died from scarlet fever in 1894, whose ages were given 95.2 per cent died before reaching the age of 16 years; and of the females, whose ages were given, 91.8 per cent died before reaching the same age.

AVERAGE DURATION OF SCARLET FEVER.—FATAL AND NON-FATAL CASES.

TABLE 17.—*Exhibiting, by sex of patient, by per cent of cases which died in specified periods of time, the duration (in days) of fatal cases of sickness from Scarlet Fever, in Michigan, during the year 1894. (Compiled from those reports which stated the length of time the patient was sick.)*

Fatal cases of Scarlet Fever.														
Year.	Sex.	No. of cases included.	Duration of Sickness:—Per cent of Deaths in each Period of Days.											
			All Periods.	0 to 5.	5 to 10.	10 to 15.	15 to 20.	20 to 25.	25 to 30.	30 to 35.	35 to 40.	40 to 45.	45 to 50.	51 days and over.
1894.	Males	37	100	35.1	24.3	18.9	2.7	2.7	2.7	2.7	0	5.4	0	5.4
	Females	42	100	40.5	26.2	19.0	2.4	7.1	2.4	0	0	2.4	0	0

From Table 17 it may be seen that of the 37 males and 42 females who were reported to have died from scarlet fever in 1894, and of which the interval between the day of being taken sick and the day of death was given, the largest per cent died before the sixth day of sickness; and the next highest per cent died in the period from 5 to 10 days. 59.4 per cent of males and 66.7 per cent of females died before the eleventh day of sickness.

The average duration of sickness for fatal cases in 1894 was 14.3 days for males, and 9.3 days for females and 11.7 days for both sexes.

TABLE 18.—*Exhibiting by Sex of patient, by per cent of cases which recovered in specified periods of time, the Duration (in days) of Non-Fatal cases of sickness from Scarlet Fever, in Michigan, during the year 1894. (Compiled from those reports which stated the length of time the patient was sick.)*

Non-Fatal Cases of Scarlet Fever.														
Year.	Sex.	No. of cases included.	Duration of Sickness:—Per Cent of Cases in each Period of Days.											
			All Periods.	0 to 5.	5 to 10.	10 to 15.	15 to 20.	20 to 25.	25 to 30.	30 to 35.	35 to 40.	40 to 45.	45 to 50.	Over 50 days.
1894.	Males	761	100	2.2	21.6	28.4	19.8	8.3	7.8	5.3	2.2	2.8	1.1	.7
	Females	899	100	3.7	18.7	26.5	20.2	11.7	6.7	5.9	2.8	2.2	.4	1.2

From Table 18 it may be seen that in the non-fatal cases of scarlet fever in the year 1894, of which the interval between the day of being taken sick and the day of recovery was given, that 72.01 per cent of males and 69.1 per cent of females recovered before the twenty-first day of sickness.

The average duration of sickness of non-fatal cases of scarlet fever, in 1894, was 17.1 days for males and 18.1 days for females.

RÖTHELN (GERMAN MEASLES) IN MICHIGAN IN 1894.

During the year ending December 31, 1894, there were 24 outbreaks of rötheln reported to the Secretary of the State Board of Health. In 17 of the 24 outbreaks,* 291 cases and one death were reported. The case at Ironwood city, Gogebic Co., is the only one reported as having proved fatal.

The following is a list of localities from which rötheln was reported:—Marengo Tp., Calhoun Co.; Petoskey Vil., Emmet Co.; Chester Tp., and Potterville Vil., Eaton Co.; Flint City, Genesee Co.; Ironwood city, Gogebic Co.; Sherman Tp., Huron Co.; Metamora Vil., Lapeer Co.; Manistee city, Manistee Co.; Farmington Vil. and Pontiac Tp., Oakland Co.; New Haven Tp., Shiawassee Co.; Capac Vil., St. Clair Co.; Burr Oak Tp., St. Joseph Co.; Akron Tp., Tuscola Co.; and Trenton and Wayne Vills., Wayne Co.

Compared with the number of outbreaks and cases reported in the previous two years, we find a marked increase in 1894. This is due to several reasons: Since the State Board of Health declared rötheln to be a communicable disease, more care has been taken by health officers to report cases to this office Practitioners and others are becoming better acquainted with the specific nature of the disease, where, heretofore, owing to its mild nature, little attention was paid to it, and no doubt a large number of cases existed of which the health officials were in entire ignorance. The importance of isolation and disinfection in cases of rötheln is apparent when it is known that the disease spreads so rapidly as to infect whole communities and schools in a very short time. But the main reason for its restriction is the fact that scarlet fever is so often mistaken for rötheln, so that in restricting what is apparently rötheln a more fatal disease is sometimes restricted.

The following correspondence received by the Secretary of this Board will show some points of interest in connection with this disease. In his special final report Dr. A. G. Oven, Health Officer of Petoskey, cites an instance where a case of rötheln was at first diagnosed as scarlet rash. Dr. Oven wrote as follows:—"Dr. in charge reported first case to be 'scarlet rash' and told her that it was so light that isolation was unnecessary. Consequently I have had trouble in restraining them. Afterwards two others in the same family came down with an eruption. I saw them and was satisfied that the disease was 'German measles' * * * * . None of them were sick to any great degree and none had sore throats."

The following was written by Dr. D. E. Robinson, Health Officer of Manistee:—"The epidemic was so mild that physicians were called in but few cases, and many cases were probably not known to this office." Fifty cases were reported from that city.

In his final report Dr. E. R. Espie, Health Officer of Potterville village, said in regard to the outbreak there,—"There were so many cases that required no medical attendance that there could not be kept a correct record of the number of cases; isolation and disinfection could not be carried out." About 20 cases were reported by him.

* The 7 remaining outbreaks were in: Bad Axe Vil., Huron Co.; Armada and Richmond Vills., Macomb Co.; Oxford Vil., Oakland Co.; Durand Vil. and Venice Tp., Shiawassee Co.; and Livonia Tp., Wayne Co. In the communications relative to these outbreaks, received at this office, the numbers of cases were not stated, and no final report was received concerning them.

Relative to the outbreak in Metamora village, Lapeer Co., Dr. G. W. Stone, Health Officer, said in his final report.—"All cases very mild, and many did not have treatment. Isolation and disinfection neglected in this outbreak." In this outbreak 26 cases occurred.

Dr. G. W. Shipman, Health Officer of Armada village, Macomb Co., wrote as follows relative to the outbreak there:

"Referring to your circular regarding the cases of rötheln in this village, I would say that none were reported to me, as the cases were very mild and no physician employed. It was by accident that I found there were any cases at all. I don't see how you can compel disinfection at this late date. I have kept a strict watch since, but no new cases have occurred, and others were entirely recovered before my attention was called to the matter."

Dr. McGurk, Health Officer of Capac Vil., on a final report relative to the source of contagium of rötheln, stated:—"First case cannot tell definitely as there were cases all round us; and the remaining cases were contracted from the first." Again he states:—"This disease has been prevailing in Capac and townships of Mussey and Berlin all spring." And relative to a single case Dr. McGurk stated:— 'He no doubt came in contact with some of these." Rötheln was not reported from the townships of Mussey and Berlin, but measles was reported quite prevalent there about that time.

The following paragraphs in the Annual Report for 1893, page 304, explain the action of this State Board taken October 1, 1886, in regard to this disease:

"Cases of rötheln should be isolated, as it is communicated from person to person.

"This State Board of Health has caused rötheln to be placed on the list of 'diseases dangerous to public health' and recommends that all cases be reported and action taken to prevent its spread, because when scarlet fever first makes its appearance, it is sometimes difficult to determine whether it is rötheln or scarlet fever, and if it is called rötheln and not reported a dangerous disease may spread. Therefore, and because what is alleged to be rötheln sometimes causes deaths this Board has voted that rötheln should be considered a 'disease dangerous to public health' and as such, it should be reported, and the same precautions taken to prevent its spread as are taken to prevent the spread of scarlet fever."

In all cases the public health should be given the benefit of any doubt, and precaution taken against the spread of any contagious disease which may prove to be dangerous.

TYPHOID FEVER IN MICHIGAN.—DURING THE YEAR ENDING DECEMBER 31, 1894.

During the year ending December 31, 1894, there were reported to the Secretary of the State Board of Health 600 outbreaks of typhoid fever (includes "typho-malarial") in 530 localities in Michigan in which there were reported to have occurred 2,805 cases and 506 deaths. Notwithstanding the marked improvement which the State Board of Health has succeeded in bringing about both in promptness and accuracy of reports of local health officials to the central office, it is still evident that not all cases of sickness and deaths from typhoid fever are yet reported. For the year 1894 there were reported to the Secretary of State 536* deaths from typhoid fever,—30 more than were reported to this Office. The Secretary of the State Board of Health has estimated that in past years the deaths reported to the Secretary of State should be increased by about 40 per cent in order to equal the actual number of deaths which occurred; according to this estimate, there were probably about 750 deaths from typhoid fever in Michigan during the year 1894.

TYPHOID FEVER IN 1894, COMPARED WITH PREVIOUS YEARS.

Comparisons with previous years, to ascertain the comparative increase or decrease of the prevalence of typhoid fever in this State, are interesting and instructive, and they would be more so if there existed a fixed basis on which to found such comparisons; but from year to year there has been a steady improvement, both in the methods adopted by the State Board of Health in securing and compiling reports, and in the efforts made by the local health officials throughout the State to furnish in their reports the information desired by the State Board. It is, therefore, still impossible to determine the exact increase or decrease of prevalence of the disease in this State by comparisons of the numbers of outbreaks of the disease, and the cases and deaths reported to this office year by year. This fact should be borne in mind when referring to Table 1.

Typhoid fever occurs in waves, the principal waves appearing to be about twelve years apart, with one or two minor waves intervening. This may be seen by referring to Table 2 and the accompanying diagram, representing the number of deaths per 100,000 persons living. The cause for the great rise in typhoid fever in certain years is to be sought for in the fouling of the water supply; and so far as relates to country districts and places depending upon wells for a water supply, the cause is to be sought for in the fall in the ground water, in wells, etc., as has been pointed out in the preceding reports. Possibly also, in filthy places, the extreme dryness of the surface soil may be found to have causal relation, because the germs are not destroyed at once by drying. Table 2 and the illustrative diagram† probably quite accurately represent the annual fluctuations of, though not

* These 536 deaths do not include those reported as caused by typho-malarial fever, while the 506 reported to this office include those reported as caused by typhoid fever and typho-malarial fever.

† Table two and the diagram [plate 843] are printed on page 278.

the total deaths from, typhoid fever in Michigan during the twenty-seven years 1868–94, as the law for collecting and compiling this information in the office of the Secretary of State has remained nearly the same throughout the twenty-seven years.

Tables 1 and 3, of this article, show that there was a decrease of about twenty (20.1) per cent in the reported sickness from typhoid fever in 1894, compared with 1893, and a decrease in the deaths of nearly 15 per cent; while the number of final reports was increased over 39 per cent.

Reference to Tables 1 and 2 of this article, and the comparison of Table 3 with a similar table in the article on typhoid fever in 1893 (in the Annual Report of this Board for 1894) shows that the numbers of cases and deaths reported were less in 1894 than in 1893, yet the fatality was very slightly greater than in 1893; that is, a larger proportion of the reported cases were fatal. Not much importance can be attached to this, however, because so much depends upon methods of reporting cases and deaths; for instance, only fatal cases were reported from Detroit in 1894; but the lessened fatality in 1893 is apparently due to the nature of the epidemic in Ironwood The death-rate,—that is the ratio of deaths to population—was slightly less in 1894 than in 1893, as in 1893 there was 2.69 deaths per 10,000 inhabitants, while in 1894 there were 2.30.

TABLE 1.—TYPHOID FEVER.—*Exhibiting the numbers of Outbreaks, Localities, Cases and Deaths reported for each of the eleven years, 1884–94; also for some of those years the average Cases and Deaths per Outbreak, the Deaths to 100 Cases, and the number of Special Final reports received.*

Year.	Outbreaks Reported.	Localities Reported.	Cases Reported.	Deaths Reported.	Average Cases per Outbreak.	Average Deaths per Outbreak.	Deaths per 100 Cases.	Final Reports Received.
1884	----------	245	969	290	----------	----------	27	----------
1885	218	200	715	194	3.28	.89	28	----------
1886	290	282	1,194	282	4.15	.75	18	60
1887	335	320	3,424	411	*7.24	*1.23	17	46
1888	316	296	1,511	310	4.78	.98	21	60
1889	432	398	2,530	402	†5.17	†.93	†18	115
1890	330	310	1,924	304	5.83	.92	16	135
1891	543	501	4,670	697	8.60	1.28	15	208
1892	527	484	2,591	538	4.92	1.02	21	216
1893	545	504	‡3,512	594	6.44	1.09	17	230
1894	600	530	2,805	506	4.67	.84	18	321
Averages, 1886-94	435	403	2,685	449	5.76	1.00	18	155

* The large average numbers of cases and deaths per outbreak in 1887 is partially accounted for by the fact that in two outbreaks the disease became epidemic, resulting in an aggregate of 535 cases and 73 deaths.

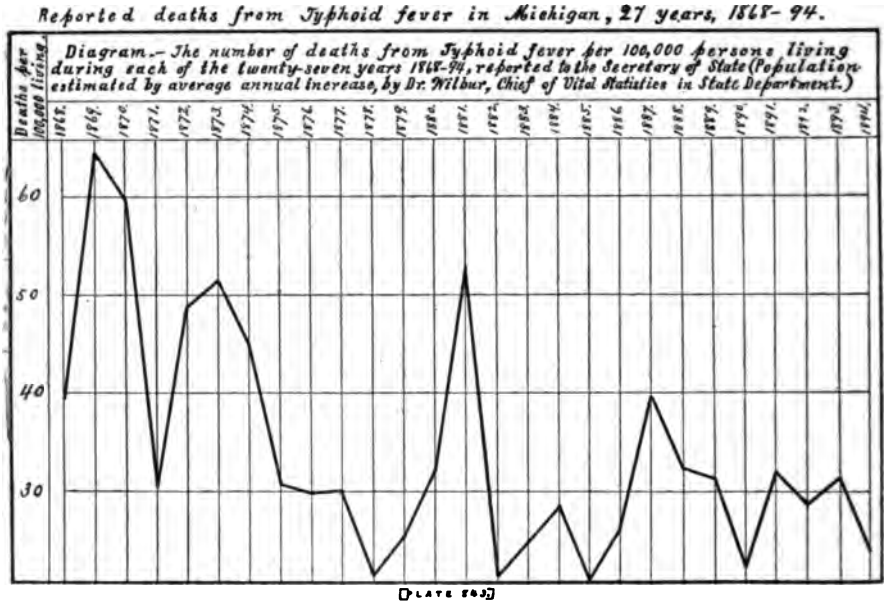
† In computing the average numbers of cases and deaths per outbreak, and the per cent ratio of deaths to cases in 1889, the outbreak at Negaunee, in which 300 cases were reported, is omitted, because the number of deaths which occurred in that outbreak was not reported.

‡ The large number of cases reported in 1893 is accounted for by the fact that in Ironwood the disease became epidemic, and the one outbreak resulted in 824 cases and 38 deaths.

TABLE 2.—*Exhibiting the reported number of deaths from Typhoid Fever per 100,000 persons living in Michigan in each of the 27 years, 1868-94. Compiled from the Secretary of State's Vital Statistics of Michigan. (Population estimated by average annual increase, by Dr. Wilbur, Chief of Vital Statistics in State Department.)*

Year.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	
Deaths	39.20	64.44	59.46	30.34	48.64	51.29	44.68	30.70	29.67	29.98	21.28	25.26	32.07	
Year.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.
Deaths	52.66	21.41	24.92	28.41	20.85	26.22	39.40	32.06	31.15	22.21	31.97	28.65	31.25	23.91

Reported deaths from Typhoid fever in Michigan, 27 years, 1868-94.



DISTRIBUTION OF TYPHOID FEVER BY DIVISIONS AND COUNTIES DURING 1894.

Table 3 exhibits the distribution of typhoid fever in 1894, by divisions of the State, and Table 4 and the accompanying map exhibit in slightly different ways, the reported typhoid fever, by counties during the year 1894. The tables exhibit the death-rates as well as the reported number of deaths. The map, for 1894, exhibits only the reported cases and deaths, but enables the reader to see the locations of the several counties.

TABLE 3.—*Exhibiting the Population of Michigan for the year 1894, by tiers of counties (Upper Peninsula as one tier); also the numbers of cases of and deaths from Typhoid Fever* REPORTED *from each of these divisions for 1894, and the numbers of cases and deaths per 10,000 population of each division.*

State, and Counties Grouped by tiers, most Northern Counties First.			Population, 1894.*	Reported Cases of Typhoid Fever, 1894.	Reported Cases per 10,000 Population.	Reported Deaths from Typhoid Fever, 1894.	Reported Deaths per 10,000 Population.
State			2,241,454	2,805	12.5	506	2.3
Upper Peninsula	Keweenaw. Ontonagon. Houghton. Baraga. Marquette. Alger. Schoolcraft. Luce.	Chippewa. Gogebic. Iron. Dickinson. Menominee. Delta. Mackinac.	206,572	530	25.6	59	2.86
Eleventh tier of counties	Manitou. Emmet. Charlevoix.	Cheboygan. Presque Isle.	42,085	40	9.5	5	1.19
Tenth tier of counties	Leelenaw. Antrim. Otsego. Montmorency.	Alpena.	46,766	20	4.3	5	1.07
Ninth tier of counties	Benzie. G'd Traverse. Kalkaska.	Crawford. Oscoda. Alcona.	41,135	37	9.0	8	1.94
Eighth tier of counties	Manistee. Wexford. Missaukee. Roscommon.	Ogemaw. Iosco.	66,747	90	13.5	23	3.44
Seventh tier of counties	Mason. Lake. Osceola. Clare.	Gladwin. Bay. Huron. Arenac.	154,145	163	10.6	30	1.95
Sixth tier of counties	Oceana. Newago. Mecosta. Isabella.	Midland.	91,113	157	17.3	18	1.98
Fifth tier of counties	Muskegon. Montcalm. Gratiot. Saginaw.	Tuscola. Sanilac.	250,444	247	9.9	38	1.52
Fourth tier of counties	Ottawa. Kent. Ionia. Clinton.	Shiawassee. Genesee. Lapeer. St. Clair.	378,642	664	17.5	116	3.06
Third tier of counties	Allegan. Barry. Eaton. Ingham.	Livingston. Oakland. Macomb.	220,670	205	8.9	36	1.56
Second tier of counties	Van Buren. Kalamazoo. Calhoun. Jackson.	Washtenaw. Wayne.	503,098	405	8.5	124	2.46
First tier of counties	Berrien. Cass. St. Joseph. Branch.	Hillsdale. Lenawee. Monroe.	220,066	247	10.7	44	1.91

* From State Census of 1894.

TABLE 4.—*Numbers of Cases and Deaths reported from Typhoid Fever, and the Cases and Deaths per 10,000 persons living in each county in Michigan during the year 1894. (Compiled from reports of health officers, clerks, etc.)*

Counties.	Population of Michigan for 1894.*	Number of reported		Number, per 10,000 population, of		Counties.	Population of Michigan for 1894.*	Number of reported		Number, per 10,000 population, of	
		Cases.	Deaths.	Cases.	Deaths.			Cases.	Deaths.	Cases.	Deaths.
State	2,241,454	2,805	506	12.5	2.3	Keweenaw	2,804	4	1	14.3	7.1
						Lake	5,895	14	2	23.7	3.4
Alcona	5,411					Lapeer	28,874	45	4	15 6	1.4
Alger	1,384	3	1	21.7	7.2	Leelanaw	9,395	3	2	3.2	2.0
Allegan	39,185	61	8	15.6	2.0	Lenawee	48,541	82	13	17.	2.6
Alpena	17,715	1	0	.6	0.0	Livingston	20,435	3	0	1.4	
Antrim	12,427	2	1	1.6	.8	Luce	2,348	34	1	144.8	4.2
Arenac	6,941					Mackinac	7,237				
Baraga	4,232	8	2	18.0	4.7	Macomb	32,382	13	0	4.0	0.0
Barry	23,699	19	2	8.0	.8	Manistee	26,112	27	10	10.3	4.0
Bay	61,292	42	5	6.9	.82	Manitou	917				
Benzie	8,060	16	4	19.8	.5	Marquette	38,004	87	16	22.9	4.2
Berrien	45,628	47	14	10.3	3.1	Mason	18,418	46	9	25.0	4.9
Branch	26,204	35	6	13.4	2.3	Mecosta	20,730	17	5	8.2	2.4
Calhoun	47,471	52	5	10.9	1.1	Menominee	23,736	43	8	18.1	3.4
Cass	21,176	16	2	7.6	.94	Midland	13,223	69	7	52.2	5.3
Charlevoix	10,931	4	2	3.7	1.8	Missaukee	6,956	34	8	48.9	11.5
Cheboygan	13,896	17	2	12.2	1.4	Monroe	33,179	30	5	9.0	1.5
Chippewa	15,319	78	7	50.9	4.6	Montcalm	34,155	43	7	12.9	2.1
Clare	7,975	8	1	10.0	1.3	Montmorency	2,435				
Clinton	26,262	35	10	13.3	3.8	Muskegon	37,323	19	8	5.1	2.1
Crawford	2,710					Newaygo	19,124	5	0	2.6	0.0
Delta	19,259	8	5	4.2	2.6	Oakland	42,668	47	8	11 0	1.8
Dickinson	14,699	42	2	28.6	1.4	Oceana	16,597	16	3	9.6	1.8
Eaton	32,612	33	4	10.1	1.2	Ogemaw	5,636	3	2	5.3	3.5
Emmet	10,381	19	1	18.3	1.0	Ontonagon	6,873	6	0	8.7	0.0
Genesee	40,553	47	5	11.3	1.2	Osceola	16,475	16	3	9.7	1.8
Gladwin	4,900	4	3	8.2	6.1	Oscoda	1,804				
Gogebic	14,083	60	4	42.6	2.8	Otsego	4,794	14	2	29.2	4.2
G'd Traverse	17,514	15	4	8.6	2.3	Ottawa	39,075	36	12	9.2	3.1
Gratiot	28,770	44	4	15.3	1.4	Presque Isle	5,910				
Hillsdale	30,271	11	1	3.6	.3	Roscommon	1,657				
Houghton	44,174	151	10	34.2	.23	Saginaw	81,841	22	1	2.7	.12
Huron	32,249	33	7	10.2	2.1	Sanilac	33,944	71	12	20.9	3.5
Ingham	39,689	29	14	7.3	3.5	Schoolcraft	7,127	5	2	7.0	2.8
Ionia	34,817	55	11	15.8	3.2	Shiawassee	32,527	77	13	23.4	4.
Iosco	12,339	6	0	4.9	0.0	St. Clair	54,315	119	16	21.9	2.9
Iron	5,293	1	0	1.9	0.0	St. Joseph	25,087	26	3	10.4	1.2
Isabella	21,439	50	3	23.3	1.4	Tuscola	34,411	48	6	13.9	1.7
Jackson	46,527	74	9	15.9	1.9	Van Buren	31,059	34	5	10.9	1.6
Kalamazoo	42,055	72	13	17.1	3.1	Washtenaw	43,491	11	4	2.5	.9
Kalkaska	5,637	6	0	10.6	0.0	Wayne	292,495	162	88	5.5	3.0
Kent	121,919	250	45	20.5	3.7	Wexford	14,047	20	3	14.2	2.1

* According to the State Census of 1894.

DISTRIBUTION OF TYPHOID FEVER IN MICHIGAN IN 1894.

BY COUNTIES, THE REPORTED CASES AND DEATHS



[PLATE 22]

Reported Sickness-rates from typhoid fever in 1894.

While it is probable that the reporting of cases of sickness from typhoid fever is not as complete as the reporting of deaths from that disease, yet comparisons may be made, subject to a mental reservation that not all cases are reported, and that it is quite possible that the omissions are greater in some parts of the State than in others.

Considering the State by tiers of counties, Table 3 shows that the greatest reported prevalence of typhoid fever was in the upper-peninsular tier, where the sickness-rate reached 25.6 cases per 10,000 inhabitants, which is more than double the reported sickness-rate for the State as a whole; and the least prevalence was in the tenth tier, where the sickness-rate was only 4.3 cases. In the fourth and sixth tiers the sickness-rate, though not so high as that in the Upper Peninsula, was considerably higher than the average rate for the State.

The reported prevalence of typhoid fever in the Upper Peninsula, in 1894, being over twice as great as the average reported prevalence for the whole State, and nearly one-half greater than for any other tier of counties, although remarkable is not unusual. In 1893, the reported sickness-rate from typhoid fever was nearly six times as great as the average sickness-rate for the whole State, and over five times as great as that in any other tier of counties. The unusually large amount of sickness reported from typhoid fever in some parts of the Upper Peninsula, and the probble causes thereof are referred to on page 261 of the Annual Report of this Board for 1894.

By counties, the greatest sickness-rate reported from this disease in 1894 was in Luce county, where the ratio of cases to population was 144.8 per 10,000. The sickness-rates of several other counties were largely in excess of the average rate for the whole State, they being as follows:—Gogebic 42.6, Chippewa 50.9, Midland 52.2, Missaukee 48.9, Houghton 34.2, Otsego 29.2, and Mason 25.0 per 10,000 persons living in those counties; whereas the average sickness-rate for the State was only 12.5 per same number of inhabitants.

From the following nine counties having an aggregate population of 35,022 there was no typhoid fever reported during the year: Alcona, Arenac, Crawford, Mackinac, Manitou, Montmorency, Oscoda, Presque Isle and Roscommon.

Reported Death-rates From Typhoid Fever in 1894.

The last columns in Tables 3 and 4 supply data for a more satisfactory comparison of sections of the State with reference to typhoid fever than is supplied by the data relative to cases of sickness from that disease.

Table 3 shows the greatest death-rate to have been in the eighth tier of counties, and the fourth, second and Upper Peninsular tiers to have each had a slightly greater death-rate than the average for the whole State, in 1894.

Table 4, however, shows that not all the counties in the eighth tier had deaths reported from typhoid fever, and that the excessive mortality was in the counties of Missaukee, Alger, Keweenaw, Gladwin and Midland. In most of these counties the population is very small, and the actual cases and deaths very few.

The fourth tier, including Ottawa, Kent, Ionia, Clinton, Shiawassee, Genesee and St. Clair counties, has next to the largest death-rate; the

first five of these counties have a somewhat larger death-rate than the average for the whole State. It is impossible to attribute this to smallness of population for all of the counties in the tier are fairly populous, and Kent is the second county in point of population in the State. The city of Grand Rapids, with a death-rate of 4.4, and Walker Tp., with 4 deaths and a very small population, brings the death-rate up to 3.7 per 10,000 inhabitants in Kent Co. The 6 deaths in Birmingham Tp., and the 2 in Westphalia village, both localities of small population bring the death-rate in Clinton Co., up to 3.8. Owosso, with a death-rate of 8.5, brings the average for Shiawassee Co., above the average for the whole State, giving it a death-rate of 4.

The second tier of counties, embracing Van Buren, Kalamazoo, Calhoun, Jackson, Washtenaw and Wayne, had a death-rate of 2.46, which is very slightly greater than the average for the whole State. The two counties in this tier that had the greatest death-rates are Kalamazoo and Wayne. The large proportionate number of deaths in the townships of Monguagon with 8 deaths and small population, and Dearborn with 2 deaths, the village of Trenton with 5 deaths and the city of Detroit which contributes 68 deaths, a death-rate of 3 brings the death-rate in Wayne county up to 3. In Kalamazoo county all the deaths, 13, were in the city of Kalamazoo, a death-rate there of 6.2, and when spread over the county, of 3.1 per 10,000 inhabitants.

In the Upper Peninsula which shows a slightly greater reported death-rate than the average for the whole State, the counties of Keweenaw, Baraga, Marquette, Alger, Luce, Chippewa and Menominee had the largest death-rates, all being above the average reported for the State. The counties of Keweenaw and Alger have been mentioned before, and the counties of Baraga and Luce might also be included among the counties whose population is so small, considerably under 10,000, that even one death gives them a greater death-rate than that reported for the whole State; aside from these four counties last mentioned in the Upper Peninsula, the counties of Marquette, Chippewa and Menominee are reported as having a death-rate somewhat above the average, and assist also, in giving the Upper Peninsula a death-rate slightly above the average for the State. The City of Marquette (death-rate 6.0) and the city of Negaunee, (8.4) bring the death-rate in Marquette county above the average. Sault Ste. Marie, with its death-rate of 8.3, is in part accountable for the higher rate in the county of Chippewa. In Menominee county the death-rate is slightly increased by that in the city of Menominee, which is 4.07.

Typhoid Fever Spreads Most in Thickly-Inhabited Places.

That typhoid fever does spread more in centers of population than in the rural districts, seems to be demonstrated by the following instances, taken from the compilation of reports of health officers for the year 1894. In Bay county out of 42 cases, 35 were reported from the city of Bay City. The sickness-rate per 10,000 inhabitants in Bay City was 12, while in the county outside the city, it was only 2.2. In Chippewa county, out of 78 cases, 54 were from the city of Sault Ste. Marie, a sickness-rate in the city of 75 per 10,000 inhabitants, and in the county outside the city the sickness rate was 30. In Dickinson county 37 out of the 42 cases were from Iron Mountain, a sickness-rate of 48 per 10,000 in the city, and in the

county outside of the city, of 7. In Kalamazoo county, 60 out of the 7 cases were from the city of Kalamazoo, where the sickness-rate per 10,000 inhabitants was 28, while in the county outside of the city there was only 6. In Kent county the whole number of cases was 250 of which 208 were reported from the City of Grand Rapids, the sickness-rate per 10,000 inhabitants of 26 for the city and 10 for the county. Of the 34 cases reported from Luce county, 30 were reported from Newberry.

Of the localities from which typhoid fever was spread into Michigan from "Outside the State" such localities as are mentioned definitely are without exception, cities. Chicago was reported as having been the source of infection of typhoid fever in two instances, with a result of two cases and one death. Cleveland, Toledo and Montpelier, Ohio, were each reported as having been the source of infection in one instance, with a result of four cases and one death; and Buckingham, Canada, was reported as having been the source of infection in one instance. The other "Outside" localities were much more indefinite and were reported as "Indiana," "Kentucky," "Missouri," "Ohio," "Ontario," "Wisconsin" and "Sweden."

In three instances Kalamazoo was reported as having been the source of infection; Grand Rapids was reported to have been the source from which typhoid fever spread to five localities, with a result of 12 cases and 2 deaths; Saginaw was reported as the source of infection in two instances; Detroit was the only locality from which typhoid fever was reported to have spread in Wayne county, three instances were reported, with a result of 10 cases.

Of the 65 localities within and without the State from which typhoid fever was reported to have spread, in Michigan, in 1894 (Table 7) 30 were cities or villages from which 40 localities were infected, 22 were rural localities from which 22 other localities were infected and 13 localities which were not specified spread typhoid fever to 13 other localities. In the second instances, or where third localities were infected from the second, three out of the four localities from which typhoid fever spread were cities or villages, and only one from a rural locality.

TYPHOID FEVER IN EACH MONTH OF THE YEAR, 1894.

TABLE 5.—*Exhibiting the reported number of outbreaks of Typhoid Fever which Began, the number which Ended, and the number of outbreaks which were Present, in each Month of the Year 1894, in the different local jurisdictions of Michigan.*

Outbreaks.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Outbreaks began....	35	14	11	24	19	31	44	100	93	88	49	20	527
Outbreaks ended....	2	10	12	9	12	15	10	17	41	54	78	77	337
Outbreaks present..	35	40	36	45	47	60	82	157	208	228	200	125	

The last line of figures, in Table 5, representing the reported number of outbreaks present, is not derived from the preceding two lines, as might be supposed, but is obtained by actual count of the number of outbreaks reported as existing in each month. Frequently the time of the beginning of an outbreak is reported, but the time of the ending of the

outbreak is not reported; and sometimes the month in which the outbreak ended is given without giving the date of the beginning of the outbreak. In either case the outbreak may have begun and ended in the same month, or it may have extended through several months. There were 190 more beginnings than endings, of outbreaks, reported during the year 1894.

TABLE 6.—*Exhibiting the Number and Per Cent of Cases of Typhoid Fever in Michigan in each Month during the Year 1894. (Includes each case for which the time during which it existed, was stated in the reports. Each of such cases is counted in each month in which, or part of which, the case was reported to have existed.)*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Number of cases sick in any part of the month	120	90	72	79	81	92	123	306	640	804	597	278
Per cent the cases sick in each month were of total reported cases	4	3	3	3	3	3	4	11	23	29	21	10

The first line of figures in Table 6 shows the number of cases reported sick in any part of each month. As some of the cases were sick longer than one month, they are included in the cases sick in more than one month, therefore the sum of the cases sick in all the months exceeds the total of reported cases in 1894; and as the last line of figures in this table shows the per cent the cases sick in each month were of the exact number of cases *reported* to this office in 1894, the sum of the figures in the last line of the table exceeds 100.

SOURCE OF CONTAGIUM OF TYPHOID FEVER.

EXHIBIT I.—*The reported "Source of Contagium" of Cases of Typhoid Fever in Michigan during the year 1894.*

Reported Sources.	Cases.
Traced to former cases*	177
Probably traced to former cases	2
Attributed to infected, contaminated, or surface water	394
Cases reported as coming from outside jurisdictions†	118
Attributed to defective sewerage or drainage	5
Attributed to filthy or unsanitary conditions	48
Cases, the sources of contagium of which were reported as unknown	679
Cases, the sources of contagium of which were not reported, or the statements were too indefinite for classification‡	1,382
Total	2,805

* Details of some of these instances, in which the disease came from without the jurisdiction, are stated in the text under the sub-head "Typhoid Fever Traced to former Cases in Distant Places."

† Details of some of these instances may be seen under the sub-head "Typhoid Fever Traced to Outside Jurisdictions."

‡ Includes cases attributed to "Malaria", "Overwork and Exposure", "Sporadic", "Endemic", etc.

MOVEMENTS OF CONTACIUM OF TYPHOID FEVER IN 1894.



[PLATE 833]

TABLE 7.—*First, second and third localities, where the second locality was infected with Typhoid Fever from the first, and the third was infected from the second; and the numbers of cases and deaths from Typhoid Fever in the first, second and third localities, with the dates of the beginning and ending of each outbreak. (Compiled from reports of health officers who were able to trace the source of contagium to other localities.)*

Number.†	First Localities from which Typhoid Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
1	Allegan county: Allegan city	*		Allegan county: Cheshire township (Oct.-Nov.)	2	0			
2	Allegan county: Dorr township	*		Mecosta county: Martiny township (Oct. 8-Nov. 1.)	1	0			
3	Allegan county: Otsego township (Dec.-Jan. 12, 1895.)	1	0	Allegan county: Martin township	3	0			
				Eaton county: Chester township (— Dec.)	1	0			
4	Baraga county: Baraga village	*		Marquette county: Michigamme twp. (July 10-Aug. 20.)	2	1	Marquette county: Ely township (Oct. 10-Nov. 20.)	1	1
5	Berrien county: Bainbridge township	1	0	Berrien county: Benton Harbor city (Jan.-Apr.)	4	0	Berrien county: Royalton township (Mar. 1 —)	1	1
6	Calhoun county: Tekonsha village (Oct. 1-Dec. 20.)	9	1	Calhoun county: Albion city (Dec. 20-Jan. 20,1895.)	1	0			
7	Cass county: Cassopolis village (Sept.-Oct. 20.)	1	0	Cass county: Penn township (Sept.-Dec. 15.)	2	0			
8	Chippewa county: Sault Ste. Marie city	54	6	Chippewa county: Pickford township (Oct. 8-Jan. 10, 1895.)	2	0			
				Lapeer county: Metamora village (Oct. 10-Jan. 15,1895.)	1	0			
9	Chippewa county: Whitefish township (Aug.-Oct. 10.)	22	1	Luce county: Newberry village (Aug. 22-Nov. 6.)	30	0	Schoolcraft county: Seney township (Nov. 6-Dec. 27.)	2	0
10	Delta county: Wells township (Nov. 3-Nov. 21.)	3	3	Delta county: Escanaba township (Dec. 3-Jan. 20, 1895.)	1	0			
11	Eaton county: Eaton Rapids city (Sept. 11-Dec. 15.)	8	0	Calhoun county: Clarendon township (Oct. 4-Nov.)	1	0			
12	Emmet county: Near Levering			Emmet county: Maple River twp. (Sept. 5 —)	2	0			
13	Gladwin county	..		Clare county: Surrey township (Sept. 4-Dec. 20.)	4	0			
14	Gogebic county: Watersmeet township (Aug. 8-Nov. 13.)	42	0	Gogebic county: Bessemer city (Sept. 9-Oct. 11.)	1	0			

* Typhoid fever was not reported to this Office by the health officer of the "first" locality at the time it was said to have spread from there; showing that the disease, if present, was neglected; probably it was not reported to the health officer as the law requires.

† The numbers in this column refer to similar numbers before quotations in the text following this table.

TABLE 7.—CONTINUED.— *Movement of Infection.*

Number.†	First Localities from which Typhoid Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
15	Grand Traverse county: Acme township (July 6-Nov.)	7	2	Gr'd Traverse county: East Bay township (Nov.-May, 1895.)	3	0			
16	Gratiot county: Ashley village (Sept. 8-Oct. 1.)	1	0	Gratiot county: Perrinton village (Nov. 27 —.)	1	0			
17	Gratiot county: North Star township	4	1	Gratiot county: Ithaca village (Aug. 20-Nov. 21.)	5	0			
18	Huron county: Colfax township (Aug. 7-Oct. 5.)	3	0	Huron county: Oliver township (Aug. 30-Nov. 10.)	3	0			
19	Ionia county	----	----	Mecosta county: Big Rapids city (Sept. 10-Sept. 26.)	1	1			
20	Jackson county: Pulaski township (Aug.-Oct.)	4	0	Jackson county: Concord township (Sept. 10-Nov. 7.)	2	0			
21	Kalamazoo county: Kalamazoo city (May 23-Dec. 31.)	60	13	St. Joseph county: Three Rivers village (Oct. —.)	1	0			
				Van Buren county: Columbia township (Dec. 5-Jan. 4, 1895.)	1	0			
				Lawrence village	1	0			
22	Kalamazoo county: Portage township	1	0	Kalamazoo county: Brady township	1	0			
23	Kent county: Grand Rapids city (Jan.-Dec.)	208	35	Clinton county: Westphalia village (Oct. 1-Dec. 4.)	4	2			
				Ionia county: Boston township (Feb. 25-Apr. 2.)	1	0			
				Jackson county: Springport village (Aug.-Aug.)	1	0			
				Kent county: Paris township (Sept. 6-Oct. 20.)	5	0			
				Ottawa county: Georgetown township (Apr.-May.)	1	0			
24	Kent county: Lowell township	*	----	Kent county: Bowne township (Apr. 28—.)	2	0			
25	Lake county: Yates township	*	----	Mason county: Sheridan township (Apr. 24-May 1.)	1	0			
26	Livingston county: Pinckney village	*	----	Jackson county: Sandstone township (Oct. 19-Dec. 30.)	1	0			

* Typhoid fever was not reported to this Office by the health officer of the "first" locality at the time it was said to have spread from there; showing that the disease, if present, was neglected; probably it was not reported to the health officer as the law requires.

† The numbers in this column refer to similar numbers before quotations in the text following this table.

TABLE 7—CONTINUED—*Movement of Infection.*

First Localities from which Typhoid Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
omb county: meo village	*	---	Sanilac county: Greenleaf township.. (Aug. 12-Nov. 2.)	10	4			
quette county: rquette city (ov. 12-Mar. 10, '95.)	3	2	Marquette county: Chocolay township.. (Nov. —.)	1	0			
quette county: ichmond township. an.—Feb.)	5	0	Marquette county: Ishpeming city. (Jan. 23-Dec. 27.)	41	7			
saukee county: Bain village (uly 10-Nov. 12.)	18	3	Missaukee county: Clam Union Twp. (Sept. 14-Dec. 29.)	5	0			
saukee county: ke township	*	---	Missaukee county: Lake city village. (Jan. 20—.)	2	1			
itcalm county: senville city	*	---	Gratiot county: Perrinton village (Nov. 1-Dec. 5.)	1	0			
land county	---	---	Lapeer county: Goodland township.. (Sept. 11-Feb. 1, '95.)	3	0			
na county: rt village ept. 15-Oct. 27.)	5	1	Oceana county: Pentwater village (Oct. 15-Dec. 12.)	1	0			
onagon county: en village	*	---	Marquette county: Ishpeming city (May —.)	1	0			
onagon county: erior township	6	0	Gogebic county: Bessemer city (Aug. 18-Sept. 18.)	2	1			
ola county: ghland township ept. 20—.)	1	0	Osceola county: Marion township (Oct. 4-Dec.)	6	0			
aw county: rinaw city Mar. 3-Nov. 1.)	8	0	Macomb county: Clinton township (Sept. 3-Sept. 30.)	1	0			
			Shiawassee county: Corunna city (Oct. 26-Nov. 4.)	1	0			
ilac county: nilac Center Vil. ct. 20-Nov. 25.)	1	0	St. Clair county: Emmet township	2	1			
awassee county: osso city eb. 25-Jan. 4, '95.)	45	7	Genesee county: Flint township.. (Oct. 26-Dec. 10.)	1	0			
lair county: rt Huron city an. 1—.)	10	0	Tuscola county: Novesta township	1	0			
Clair county: le village	12	1	St. Clair county: Brockway township. (Sept. 16-Dec.)	25	10			

umbers in this column refer to similar numbers before quotations in the text following this

oid fever was not reported to this office by the health officer of the "first" locality at the time it to have spread from there; showing that the disease, if present, was neglected; probably it was rted to the health officer as the law requires.

TABLE 7.—CONTINUED.—*Movement of Infection.*

Number.†	First Localities from which Typhoid Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
43	St. Joseph county: Burr Oak village.....	*		Berrien county: Benton Harbor city.. (Aug. 2-Sept. 20.)	5	2			
44	St. Joseph county: Leonidas township... (July 26-Dec. 1.)	9	1	St. Joseph county: Park township..... (Nov. —.)	1	0			
45	Tuscola county: Columbia township...	*		Tuscola county: Akron township (Jan. 31-Mar. 17.)	1	0			
46	Tuscola county: Fair Grove township..	11	1	Tuscola county: Akron township..... (Aug. 4-Sept. 12.)	1	0			
47	Tuscola county: Unionville village.....	*		Huron county: Sebewaing village.... (Sept. 24-Jan 6, '95.)	6	3	Huron county: Fair Haven township (Nov. 12-Dec. 16.)	1	0
48	Tuscola county: Watertown township. (Sept. 20-Oct. 27.)	2	0	Lapeer county: Oregon township.... (Oct. 15-Dec. 27.)	12	2			
49	Washtenaw county: Ann Arbor city.....	1	1	Washtenaw county: Northfield township.. (Apr. 10-May 1.)	1	0			
50	Washtenaw county: Ypsilanti city	2	0	St. Joseph county: Florence township... (Mar. 18-Mar. 24.)	1	1			
51	Wayne county: Detroit city..... (Jan.—Dec.)	86	68	Clinton county: Ovid village..... (Apr. 24-June 5.)	1	0			
				Huron county: Port Austin township (May 25-June 19.)	1	0			
				St. Clair county: Cesco township..... (June 19-Aug. 5.)	7	0			
52	Southern part of State.			Cheboygan county: Mackinaw City Vil... (Oct. 10-Jan. 30, '95.)	2	0			
				Kent county: Cedar Springs village (Oct. 1—.)	2	0			

†The numbers in this column refer to similar numbers before quotations in the text following this table.

*Typhoid Fever was not reported to this Office by the health officer of the "first" locality at the time it was said to have spread from there; showing that the disease, if present, was neglected; probably it was not reported to the health officer as the law requires.

TABLE 7.—CONTINUED.—*Movement of infection* Into Michigan *from outside the State.*

Number.†	First Localities from which Typhoid Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
53	Canada: Buckingham	---	---	Dickinson county: Breitung township (Aug. 29-Sept. 26.)	1	0			
54	Chicago	---	---	Kalamazoo county: Ross township (Aug. 6-Sept. 1.)	1	0			
				Leelanaw county: Leelanaw township (Oct. 2-Oct. 18.)	1	1			
55	Indiana	---	---	St. Joseph county: Mendon village (Aug. 10-Sept. 20.)	1	0			
56	Kentucky	---	---	Lapeer county: Metamora village (Sept. 12-Oct. 20.)	1	0			
57	Missouri	---	---	Ionia county: Sebewa township	1	1			
58	Ohio: Cleveland	---	---	Lenawee county: Morenci village (Aug. 23-Oct. 24.)	2	0			
59	Ohio: Montpelier	---	---	Hillsdale county: Woodbridge Twp. (Sept. 14-Oct. 15.)	1	0			
60	Ohio: Toledo	---	---	Lenawee county: Deerfield township (Sept. 6—.)	1	1			
61	Ohio	---	---	Kalamazoo county: Schoolcraft township (Aug. 30-Oct. 20.)	1	0			
				Wayne county: Huron township (Dec. 18—.)	1	0			
62	Ontario	---	---	Huron county: Colfax township (Aug. 7-Oct. 5.)	3	0			
63	Wisconsin: Phillips	---	---	Gogebic county: Bessemer city (Aug. 27-Oct. 8.)	1	0			
64	Wisconsin	---	---	Genesee county: Mt. Morris village (Dec. 23-Feb. 15, 1895)	1	0			
65	Sweden	---	---	Muskegon county: N. Muskegon city (June-Oct. 29.)	6	0			

† The numbers in this column refer to similar numbers before quotations in the text following this table.

TABLE 7.—CONTINUED.—**Probable *Movement of Infection.***

Number.	First Localities from which Typhoid Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
	Gladwin county: Gladwin city (Oct. 6-Nov. 15.)	1	0	Midland county: Hope township	1	0			
	Houghton county: Calumet township (Jan. 10-Dec.)	61	5	Keweenaw county: Allouez township (Sept. 23-Oct. 24.)	2	1			
	Ionia county: Belding city (July 15-Nov. 29.)	21	3	Montcalm county: Eureka township (Oct.-Oct. 14)	1	1			
	Kalamazoo county: Kalamazoo city (May 23-Dec. 31.)	60	13	Kalamazoo county: Texas township (Oct. 6-Nov. 20.)	1	0			
	Kent county: Grand Rapids city (Jan.-Dec.)	208	35	Barry county: Maple Grove twp. (Nov. 11-Jan. 29, 1895.)	1	1			
				Kent county: Cannon township (Sept. 10-Nov. 15.)	1	0			
	Lenawee county: Adrian city (Mar. 25—.)	42	7	Lenawee county: Madison township	1	0			
	Shiawassee county: Owosso city (Feb. 25-Jan. 4, 1895.)	45	7	Gratiot county: Ashley village (Sept. 8-Oct. 1.)	1	0			
				Shiawassee county: Bancroft village (Nov. 25-Dec. 25.)	1	0			
	Wayne county: Detroit city (Jan.-Dec.)	86	68	Oakland county: Waterford township (May 9-June 1.)	1	0			
				Tuscola county: Fremont township (Apr. 1-June 6.)	5	1			
				Wayne county: Hamtramck township (Jan. 16—.)	4	0			

TABLE 7.—CONTINUED.—**Probable *Movement of Infection* Into Michigan *from outside the State.***

Number.	First Localities from which Typhoid Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
	Indiana: South Bend	...	...	Hillsdale county: Hillsdale city (Aug. 1-Nov. 30.)	9	0			

Typhoid Fever Traced to Former Cases *in Distant Places.*

On subsequent pages (in paragraphs numbered as in Table 7) are examples of "Typhoid fever traced to outside of the jurisdictions," in which instances the disease was not traced directly to a definite preceding case; the following are representative statements from the reports of some of the health officers, who were able to trace cases of typhoid fever in their respective jurisdictions to cases of the disease outside of their jurisdictions,—with the source of the disease and the name of the health officer, and of his jurisdiction. The numbers preceding the following quotations correspond with similar numbers in Table 7 of this article. The arrangement is alphabetically by counties.

1. "A friend in Allegan."—*H. C. Belcher, Clerk, Cheshire Tp., Allegan Co.*

10. "The family this case occurred in had lately moved here and contracted the disease from another member of the family in the Township of Wells."—*Wm. Dansey, H. O., Escanaba Tp., Delta Co.*

15. "The first person sick had frequently visited a family in Acme Tp., who were having typhoid fever. The family think it came through drinking-water; the Dr. said it came from Acme through Mrs. Andrews."—*Ernest J. Taylor, H. O., East Bay Tp., Grand Traverse Co.*

62. "Mrs.—— went to Ontario to see a brother ill with typhoid fever, shortly after her return the disease developed."—*D. J. McCall, M. D., Acting H. O., Colfax Tp., Huron Co.*

2. "The patient was on a visit at Dorr Center, Allegan Co., Mich., where the fever was raging; after his return home from his visit he was taken down with the disease."—*Wm. Sterzik, H. O., Martiny Tp., Mecosta Co.*

9. "Patient brought here form Newberry, Mich., for treatment." "Supposed to be contracted by caring for other cases."—*Frank P. Bohn, M. D., Seney Tp., Schoolcraft Co.*

45. "From a case in Columbia Tp. He was medical attendant to the typhoid patient."—*Thurlow S. Miller, M. D., Akron Tp., Tuscola Co.*

Typhoid Fever Traced to Outside of the Jurisdictions.

On preceding pages are statements of representative instances of the tracing of typhoid fever to definite preceding cases of typhoid fever. The following are extracts from representative reports of health officers, who were able to trace the source of contagium of typhoid fever, in their jurisdictions, to localities outside of their jurisdictions,—with the name of the health officer and the place of his jurisdiction subjoined. The numbers placed before quotations refer to similar numbers in the first column of Table 7. The arrangement is alphabetically by counties.

3. "Carried from Otsego Tp."—*J. A. Heasley, M. D., Martin Tp., Allegan Co.*

43. "One case came from Burr Oak."—*F. A. Votey, M. D., Benton Harbor, Berrien Co.*

5. "From Bainbridge."—*Wakeman Ryno, M. D., Benton Harbor, Berrien Co.*

5. "From Benton Harbor City."—*C. L. Bunker, H. O., Royalton Tp., Berrien Co.*

6. "Patient came here from Tekonsha."—*A. M. Haight, M. D., Albion, Calhoun Co.*

11. "It was brought here from Eaton Rapids."—*Joseph E. Daniels, Clarendon Tp., Calhoun Co.*

7. "Came to his home sick with it, came from Cassopolis."—*Jno M. Wright, M. D., Penn Tp., Cass Co.*

52. "Contracted in southern part of the State while visiting."—*G. E. Brown, Mackinaw City, Cheboygan Co.*

8. "Had its origin in bad water drank from general water supply in Sault Ste. Marie."—*D. H. Webster, M. D., Pickford Tp., Chippewa Co.*

51. "Case came from Detroit."—*Jas. E. Taylor, M. D., Ovid, Clinton Co.*

23. "The first case came with this disease from Grand Rapids."—*Julius Shoenith, M. D., Westphalia, Clinton Co.*

12. "Brought from Cedar camp in north part of the State, near Levering, Emmet Co."—*H. W. Morford, H. O., Maple River Tp., Emmet Co.*

40. "Was contracted at Owosso, Shiawassee Co."—*Thos. E. Nesbitt, H. O., Flint Tp., Genesee Co.*

64. "Brought from Wisconsin."—*H. W. Graham, M. D., Mt. Morris, Genesee Co.*

36. "From Trout Creek, Interior Tp., Oatonagon Co."—*Geo. D. Slocum, M. D., Bessemer, Gogebic Co.*

63. "From Phillips, Wisconsin."—*Geo. D. Slocum, M. D., Bessemer, Gogebic Co.*

14. "Watersmeet Tp., Gogebic Co."—*Geo. D. Slocum, M. D., Bessemer, Gogebic Co.*

17. "One person took disease or was exposed to the fever from a person that came from North Star."—*John A. Hart, H. O., Ithaca, Gratiot Co.*

32. "By patient coming from Greenville."—*G. Burton Wade, M. D. Perrinton, Gratiot Co.*

16. "From Ashley village."—*G. Burton Wade, M. D., Perrinton, Gratiot Co.*

51. "From Detroit, Mich., was a deck hand on steamer Pilgrim."—*E. B. Gibson, M. D., Pt. Austin Tp., Huron Co.*

23. "Patient contracted the disease at Grand Rapids, Mich., while he was attending business College."—*Charles Wunch, M. D., Boston Tp., Ionia Co.*

57. "Brought from Missouri."—*Charles L. Halladay, H. O., Sebawa Tp., Ionia Co*

23. "The patient came here from Grand Rapids."—*M. Pasco, M. D., Springport, Jackson Co.*

22. "Came from Portage Tp."—*Chas. H. McKain, M. D., Brady Tp., Kalamazoo Co.*

54. "By a lady from Chicago, she had it when she came."—*C. E. Doyle, M. D. (H. O., of Augusta), Ross Tp., Kalamazoo Co.*

61. "Patient came from Ohio where he had been sick."—*S. E. Van Antwerp, M. D, Schoolcraft Tp., Kalamazoo Co.*

24. "Moved in from Lowell Tp."—*J. E. Hunter, M. D., Bowne Tp., Kent Co.*

33. "Contracted the disease in Oakland Co. and came down with it in Goodland."—*Wm. G. Abbott, H. O., Goodland Tp., Lapeer Co.*

8. "Contracted the fever at the Soo."—*Geo. W. Stone, M. D., Metamora, Lapeer Co.*

56. "Came from Kentucky with it, was coming down when he got here."—*Geo. W. Stone, M. D., Metamora, Lapeer Co.*

54. "Patient contracted the disease in Chicago."—*Isabell R. Copp, M. D., Leelanaw Tp., Leelanaw Co.*

60. "Brought from Toledo, Ohio."—*N. D. Yale, M. D., Deerfield Tp., Lenawee Co.*

58. "It was imported from Cleveland, Ohio."—*Saml. Stevenson, M. D., Morenci village, Lenawee Co.*

25. "It was brought from the lumber camp in Lake county (Nirvana, Yates Tp.")."—*Geo. Brisbin, H. O. Sheridan Tp., Mason Co.*

19. "From Ionia Co."—*Wm. E. Dockry, M. D., Big Rapids, Mecosta Co.*

30. "No. 1 was taken sick inside ten days after he had drank water at McBain, Mich., from the same well where so many were taken sick."—*Garrit Vis, H. O., Clam Union Tp., Missaukee Co.*

34. "Patient came from Hart village already sick."—*Geo. O. Switzer, M. D., Pentwater, Oceana Co.*

28. "Contracted in Grand Rapids."—*W. Charles Covey, V. S., Georgetown, Ottawa Co.*

27. "By a family coming on a visit from Romeo, Mich."—*Albert Wickware, H. O., Greenleaf Tp., Sanilac Co.*

38. "Contracted while on a visit to Saginaw."—*Walter S. Jones, M. D., Corunna, Shiawassee Co.*

39. "A child having the disease was brought from Sanilac Co., (Sanilac Center) on a visit."—*A. J. Abbott, M. D., Emmett Tp., St. Clair Co.*

55. Patient from Indiana a month previous visiting a married sister here. There had been typhoid fever in town."—*Edwin Stewart, M. D., Mendon village, St Joseph Co.*

51. "First case came home from Detroit sick with the fever."—*Frank T. Fenton, M. D., Casco Tp., St. Clair Co.*

46. "Patient was taken sick in Fair Grove and moved to Akron."—*George P. Honeywell, H. O., Akron Tp., Tuscola Co.*

21. "Brought here from Kalamazoo sick at the time."—*Albert D. Hurlburt, M. D., Columbia Tp., Van Buren Co.*

61. "Brought from Ohio."—*Thos. Haines Parker, Clerk, Huron Tp., Wayne Co.*

Grand Rapids and Detroit were reported as having been the source of 12 and 9 cases of typhoid fever respectively in various parts of Michigan; the following cities, states and countries were also reported as having contributed to the sources of Michigan cases of typhoid fever: Buckingham, Canada; Cleveland, Toledo and Montpelier, Ohio; Chicago, Ill.; Indiana; Kentucky; Missouri; Ohio; Ontario; Wisconsin; and Sweden.

Relative to a case of typhoid fever in Florence Tp., St. Joseph Co., the health officer, Frank Hall, wrote to this office on March 26, 1894, that the case "returned from the State Normal School at Ypsilanti, * * ill with the disease. * * He died March 24."

The Secretary of this Board made inquiries as to the source of the disease and wrote to R. G. Boone, principal of the State Normal School, asking for information relative thereto. On March 28, 1896, the Secretary received a letter from the physician who attended the case, and who had evidently been questioned by Principal Boone. In his letter the physician stated that "at the place where he roomed, they used well water."

Outbreaks Attributed to Infected, Contaminated or Impure Water.

The following are extracts from reports by a few of the health officials, who attributed the cause of 394 cases of typhoid fever, in their jurisdictions, to infected, contaminated, impure, or surface water,—with the name of the health officer (or other health official) and the name of the jurisdiction subjoined:—

"Impure water."—*R. E. Flood, M. D., Harbor Springs, Emmet Co.*

"From impure drinking water."—*U. P. Fales, H. O., Leighton Tp., Allegan Co.*

"Drinking water on low ground."—*C. A. Scribner, M. D., Barry Tp., Barry Co.*

"Impure water."—*H. M. Brodrick, M. D., Buchanan, Berrien Co.*

"From impure drinking water."—*Horace P. Farley, Albion Tp., Calhoun Co.*

"Stagnant well."—*A. D. Bangham, M. D., Homer, Calhoun Co.*

"From foul drinking water."—*John I. Baker, M. D., Leroy Tp., Calhoun Co.*

"From drinking impure water."—*J. L. Robinson, H. O., Calvin Tp., Cass Co.*

"From water at school house."—*David F. Kniffin, Mackinaw Tp., Cheboygan Co.*

"Water works repairing."—*C. J. Ennis, M. D., Sault Ste. Marie, Chippewa Co.*

"Had its origin from bad water drunk from general water supply in Sault Ste. Marie."—*D. H. Webster, M. D., Pickford Tp., Chippewa Co.*

"Stagnant swamp water."—*Arthur Leighton, H. O., Bay De Noc Tp., Delta Co.*

"A man who had been working in a logging camp was taken sick, came here for treatment and the disease found to be typhoid fever. Judge it was due to drinking impure water; patient stated that he had been drinking water from ponds and creeks."—*M. F. Dockery, M. D., Sagola Tp., Dickinson Co.*

"The use of impure well water."—*Abram H. Cuddington, M. D., Thetford Tp., Genesee Co.*

"Drinking water."—*W. M. Slaght, M. D., Grand Blanc Tp., Genesee Co.*

"Drouth and bad water."—*John A Scripture, H. O., Acme Tp., Grand Traverse Co.*

"Impure water."—*Theron A. Johnson, Pine River Tp., Gratiot Co.*

"Impure water."—*Otto Frenzel, M. D., Winsor Tp., Huron Co.*

"In my opinion was from drinking water contaminated by cemetery."—*W. W. Watson, M. D., Delhi Tp., Ingham Co.*

"From drinking water at a shallow well on the Racer's place, Pulaski."—*Marshall S. Bacon, M. D., Concord Tp., Jackson Co.*

"Defective spring."—*C. D. Hubbard, M. D., Sandstone Tp., Jackson Co.*

"Bad well water."—*John McRae, M. D., Sherman Tp., Keweenaw Co.*

"Well water."—*E. E. Sayles, M. D., Pleasant Plains Tp., Lake Co.*

"From the drinking water."—*John N. Bindon, H. O., Rich Tp., Lapeer Co.*

"Probably from drinking water."—*J. E. White, M. D., Clinton village, Lenawee Co.*

"A case of an old man drinking from a well in the city of Adrian. He was not well at the time, and the case developed into typhoid fever and the patient was removed to the county house which is in the township of Madison."—*A. D. Brooks, H. O., Madison Tp., Lenawee Co.*

"From long dry weather—low water."—*S. O. Turbitt, M. D., Palmyra Tp., Lenawee Co.*

"All but two originated at a mill or camp outside my jurisdiction, coming here for treatment. (Origin contaminated water supply at Emerson, Whitefish Tp., Chippewa Co.)"—*F. W. Neal, M. D., Newberry, Luce Co.*

"I think first three cases were the result of drinking swamp water."—*A. D. Kibber, M. D., Custer Tp., Mason Co.*

"Impure water."—*John P. Swanson, M. D., Pere Marquette Tp., Mason Co.*

"Supposed to be from a well with drainage from privies and stables."—*A. A. Patterson, M. D., Chippewa Tp., Mecosta Co.*

"Bad water in well."—*Charles Martin, H. O., Hinton Tp., Mecosta Co.*

"Impure drinking water."—*Chas. I. Walter, M. D., Spaulding Tp., Menominee Co.*

"Impure water."—*Lewis E. Dean, H. O., Greendale Tp., Midland Co.*

"Dry, and low water."—*Frank Delye, H. O., Frenchtown Tp., Monroe Co.*

"Using water from swamp."—*Eugene C. Morey, Sullivan Tp., Muskegon Co.*

"From bad water."—*John Hesslewoet, H. O., Grant Tp., Oceana Co.*

"Drank water from shallow open surface well."—*Donald Johnson, M. D., Marion Tp., Osceola Co.*

"By drinking swamp water."—*Clifford M. Dunham, M. D., Middlebranch Tp., Osceola Co.*

"Drinking water from an old well."—*Wm. I. J. Bruinsma, Olive Tp., Ottawa Co.*

"The use of unhealthy drinking water."—*Thos. Whitfield, H. O., Austin Tp., Sanilac Co.*

"Impure drinking water."—*Geo. E. Vincent, M. D., Deckerville, Sanilac Co.*

"Drinking impure water."—*Geo. S. Tweedie, M. D., Sanilac Center Vil., Sanilac Co.*

"Dry summer—low water in wells."—*Geo. S. Tweedie, M. D., Watertown Tp., Sanilac Co.*

"Bad water. Was caused from rotten chips around the well; from a dead horse also."—*John Boyd, H. O., New Haven Tp., Shiawassee Co.*

"Without doubt, well water."—*Chas. A. Osborn, M. D., Owosso, Shiawassee Co.*

"From water obtained from a well."—*H. S. Watson, M. D., Capac, St. Clair Co.*

"Probably from a polluted well."—*Frank F. Fenton, M. D., Casco Tp., St. Clair Co.*

"By drinking bad water."—*Alexander Seymour, H. O., Kenockee Tp., St. Clair Co.*

"Partaking of impure water from well."—*Geo. D. Brock, M. D., Kimball Tp., St. Clair Co.*

"From drinking impure water."—*Isaac P. Green, H. O., Wales Tp., St. Clair Co.*

"From a well in village where there had been a case two years ago."—*Will H. Gowan, M. D., Yale, St. Clair Co.*

"My idea that a defective water supply, city well (a nuisance now done away with) about 20 feet from pond and 30 feet deep, rocky. The pond with central current but stagnant generally. Attack abated as soon as this was done away with."—*A. W. Scidmore, M. D., Three Rivers, St. Joseph Co.*

"From drinking water from a low well as near as we can make out."—*F. W. Harris, H. O., Fairgrove Tp., Tuscola Co.*

"Contaminated water."—*B. D'Arcy, M. D., Mayville, Tuscola Co.*

"Drinking water."—*A. H. Cameron, M. D., Watertown Tp., Tuscola Co.*

"Drinking surface water."—*Lu C. Harrison, M. D., Bangor, Van Buren Co.*

"Impure water of well."—*W. A. Mumbreve, M. D., Bloomingdale Tp., Van Buren Co.*

"By using water from a well too near a barn-yard."—*Albert S. Haskins, M. D., Lawrence Tp., Van Buren Co.*

"From impure water."—*Henry F. Homer, H. O., Canton Tp., Wayne Co.*

"Impure water."—*A. Lefebore, M. D., Ecorse Tp., Wayne Co.*

"Impure water."—*Wm. A. Atgeo, H. O., Sumpter Tp., Wayne Co.*

"Impure water."—*L. R. Cobb, M. D., Van Buren Tp., Wayne Co.*

"Impure water."—*James Calahan, M. D., Wyandotte, Wayne Co.*

"By shallow wells and filth not properly taken care of (bad water)."—*James Bentley, H. O., Springwells Tp., Wexford Co.*

Relative to an outbreak of typhoid fever in Battle Creek, which lasted from Aug. 11, 1894 to Feb. 1895, and resulted in 15 cases and one death, the health officer, S. S. French, M. D., in a letter dated Sept. 2, 1894, states that a well is suspected as being the source of the outbreak, and that the water is being analyzed. In a letter dated Oct. 29, 1894 and in a note at the end of the final report for Battle Creek in 1894, Health Officer French states practically the same thing relative to the result of the investigation of the water supply. The following is taken from the final report:

"In the first case I had the water thoroughly analyzed, it was found had but few typhoid fever germs, *many of the other wells* analyzed by the common test and found unfit for drinking."

Concerning an outbreak of tpyhoid fever in Schoolcraft township, Houghton Co., which resulted in 11 cases and 2 deaths, Dr. J. M. B. Pichette, on his "final report" for that outbreak reported as follows:

"A family uses water from a well just below a hill over which are other families and cesspools. There was a case over there three years ago. After rains the wells filled up, and shortly after came to 6 or 7 inches of water—then the disease was introduced. A boy, after drinking contaminated well water, took sick with typhoid fever."

Relative to an outbreak of typhoid fever in Kalamazoo in 1894, which lasted from May 23, to Dec. 31, and which resulted in 60 cases and 13 deaths, the health officer, Adolph Hochstein, M. D., stated that the source was:

"Contaminated well-water."

An outbreak of typhoid fever in Plainfield Tp., Kent Co., which occurred August 26, 1894, and lasted until September 16, 1894, and resulted in 3 cases and one death, was evidently traced to water from a well infected with leachings from a privy previously used for the deposit of excreta from typhoid fever patient. In his "final report" of the outbreak, Dr. Wm. Hyser, Health Officer, says:

"I now believe that the three received the contagium at the same time but the last two succumbed later, as witness the simultaneous diarrhea in all, and the last would not be in bed until thirteen days after diarrhea commenced, and died the seventh day after being confined in bed."

On the "record sheet" sent to this office some time later, Dr. Hyser reported the evident result of further investigation in the matter as follows:

"Were using water from a well at an adjoining house, that had been occupied by a family that *imported* typhoid fever, and that used the privy to deposit the excreta, which was within 30 feet from the well."

Relative to an outbrbeak of typhoid fever in Petoskey village, Emmet Co., which resulted in 6 cases and one death, O. L. Ramsdell, M. D., the health officer, reported the source as follows:

"All from using well or spring water except one, and he contracted it away from home."

Relative to an outbreak of typhoid fever in Eureka Tp., Montcalm Co., the Health Officer, George W. Gravelle states in his final report:

"Not known for certain, but he visited Belding about two weeks before he was taken sick."

In response to a letter from the Secretary of this Board, asking for the particulars in the case, Health Officer Gravelle wrote on Oct. 20, 1894, in connection with his final report as follows:

"I have visited Belding and find that Mr. S—— stopped at the B—— farm to a picnic and also at Mrs. B——'s (which is just across the street from where H—— lived) and was taken sick with the fever. Same H—— moved to another place but died with typhoid fever, and there was a case near the B—— farm this season and a man died there last year with it and was buried in an old cemetery. There is a well about 50 rods from cemetery towards town and down hill and there have been two or three cases near there lately. The water at B—— well rises to within four or five feet of the top of the ground."

Wm. C. Martin, M. D., Health Officer of Scottville, Mason Co., in reporting an outbreak of typhoid fever in his jurisdiction, which resulted in 7 cases and one death, says:

"Six cases came from one boarding house and I find their well is a dug well in the first place and then they drove a pipe down 12 feet in the bottom of the open well and there is stagnant water standing in the well."

Typhoid Fever at Iron Mountain.

The outbreak of typhoid fever at Iron Mountain causing 37 cases and 2 deaths was first reported to this office, by the Health Officer, J. F. Menestrina, M. D., July 24, 1894. On the "L" blank on which he reported one case, he stated relative to the sanitary condition of the locality: "It is a swampy locality, where well water is still in use and without sewerage." And in a letter accompanying the report Dr. Menestrina stated:

"The locality where the first case occurred is the poorest drained in the city. Nearly all the houses have been built in the swamp, and two-thirds of the year have their cellars filled with a putrid, greenish, stagnant water. On these premises no other water supply but well water is used, the closets are in close proximity and above the ground. The soil is sandy, making it favorable for the filthy surface water to be drained into the wells. It is a deplorable state of affairs, and so far, my predecessor's efforts and my own have proved unavailing to abate this nuisance. * * * .

"I would be pleased very much to hear a few words from you in regard to this matter, as at this stage a good suggestion from you may avert very serious consequences later on. * * * ."

A letter was writen from this office August 3, 1894, to Dr. Menestrina, thanking him for the information relative to typhoid fever and the condition of the community; and advising him as follows:—

"I think you have been working in the right direction, when you have endeavored to have property owners required to connect with the city water and city sewers. In such places as you describe, I think you might do well to copy the methods adopted in Brooklyn, New York, namely, declare the wells nuisances, and order them closed, and see that they *are* closed, and filled up to prevent their use.

* * * * * * * *

"Very respectfully,

"HENRY B. BAKER,

"*Secretary.*"

On August 20, 1894, a letter was received at this office from Dr. Menestrina, which stated the active measures that were being carried out to prevent further sickness from typhoid fever; the letter was as follows:—

"From the weekly report you will notice an increase in the outbreak of typhoid fever. All cases contracted the disease from drinking well water. About 60 wells and pumps in this city, have been disabled through my orders, and this work will be continued till every well or pump is gotten out of the way. Not a single sample from these wells contained any less than grs. 2.5 of free chlorine to the gallon. City water hydrants have been opened up in convenient quarters for public use.

"It is a deplorable fact that only one-third of our population makes use of the city water, and only one-eighth has sewerage connection, although nearly all our streets are supplied with both, ready to connect.

"I assure you that I shall not leave anything undone to improve the sanitary condition of this locality."

A letter from Dr. Menestrina, dated Sept. 2, 1894, showed apparently that the measures advised by the Secretary of this Board, and promptly carried out by the health officer, viz., closing up the wells which were probably the sources of the disease, produced an almost immediate effect in checking the spread of the disease. In this letter Dr. Menestrina stated, that he had succeeded in condemning and filling up some 130 wells, that the water-works had opened hydrants for private use in the infected district, and that there had been no new cases of the disease for a week. Dr. Menestrina's letter contains a few other interesting items, as follows:

"As you will notice from to-day's report, no new cases of typhoid fever have developed in a week, undoubtedly the result of the closing down of all the infected wells in the infected districts. No less than 130 wells have been permanently disabled, work that should have been done years ago, if the prejudice against our water-works water had not been in the way. All other well owners, have been warned to boil the water for drinking and cooking purposes and for dish washing, etc. So far everyone is following the advice and I hope will persevere in it.

"The question of inducing the city council to enact an ordinance to have all property owners connect their sewers, has been agitated by me, but met with opposition. Their chief reason is that most of the property owners here are a class of poor people, who, for nearly a year have been out of employment and have been supported by public subscriptions, and although now are at work they have not yet recovered from indebtedness enough to be able to make such an expense as that; the same may be said of the water-works connection. They agreed however to establish at their expense water hydrants in the infected districts."

In 1891, a severe epidemic, resulting in 210 cases and 15 deaths, so alarmed the authorities that a sum of money was voted by the Common Council of the City of Iron Mountain to defray the expenses of a Sanitary Convention, with especial reference to typhoid fever, which convention, under the direction of the State Board of Health was held at Iron Mountain, October 30 and 31, 1891. Recommendations were made, and advice given concerning the sanitation of the city, apparently with good results, for in 1892 only 30 cases and 5 deaths were reported. In 1893 there were reported 49 cases and 8 deaths, and in 1894, 37 cases and 2 deaths. Apparently there were less deaths from typhoid fever in 1894 than in any recent year, and this might have been expected from the active efforts of the health officer—Dr. Menestrina. Such work as that by Dr. Menestrina ought to be maintained in Iron Mountain for a number of years and the typhoid fever thus entirely done away with. Public economy as well as public health demands that it be done.

Typhoid Fever at Duncan Township, Houghton Co.

Relative to an outbreak of typhoid fever in Duncan township, Houghton county, which resulted in 53 cases and 1 death, and which was apparently attributed to contaminated water, Dr. W. McBurney, Health Officer of Duncan Tp., wrote to this office, September 3, as follows:

"In Kenton most of the people used water from a saloon pump, placed back of the saloon and right near a kitchen of a hotel. The well had been dug about eight feet and then driven. I found the part that was dug was nearly full of filth. I had it removed, and disinfected the hole and filled it up. I have as yet discovered no cause for the outbreak in Sidnaw except the extraordinary dry weather there and low water."

September 5, the Secretary of this Board wrote to Dr. McBurney as follows:

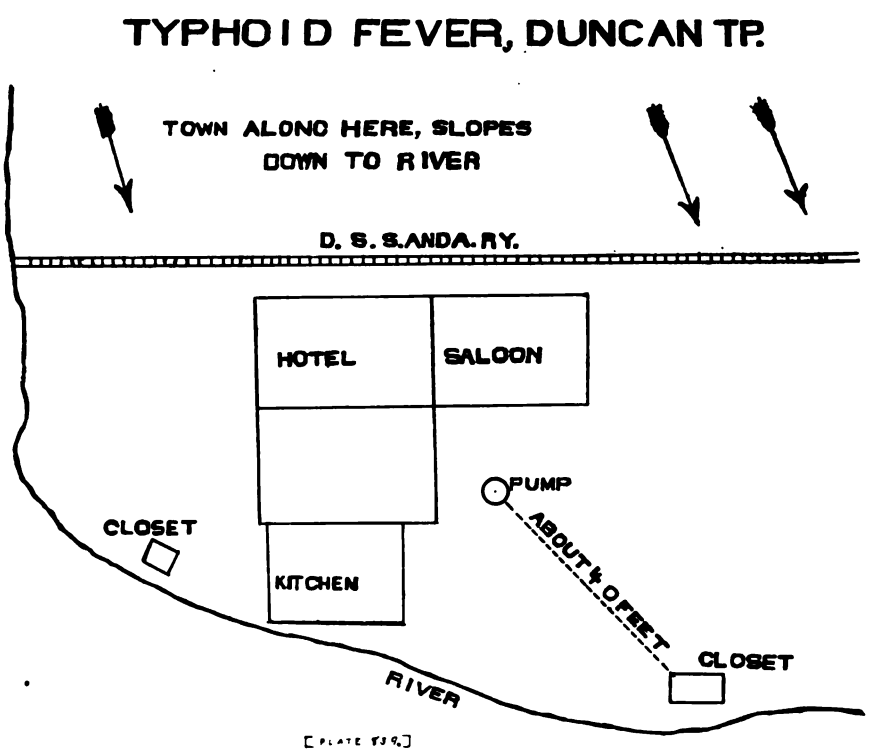
"Accept thanks for your letter of Sept. 3, and for the weekly report on blank 'M' for the week ending Sept. 1, relative to typhoid fever. The source of the water-supply for 'most of the people' of Kenton, as you discribe it, will, I think account for the great number of cases in that village. I would suggest that the pump be withdrawn from that well and that it be filled up and abandoned. Or if that is not done, that the water be boiled in every instance before using. If that is not done, I fear you may expect the continuance of typhoid fever in families using the water, notwithstanding the improvement which you have caused to be made in that part which was dug out.

"Will you have the kindness to give me the nature of the soil in the village of Kenton? (2) If possible, tell me the kind of ground throughout the entire depth of the well. (3) How deep is the well? (4) Have there been any cases of typhoid fever in any houses near the well within the past year?

"I would be pleased to have a diagram showing the location of the well, the privies, the house, outhouses, etc., and their distance from it."

Dr. McBurney replied to the above letter on September 10, 1894, and enclosed a diagram of the locality from which the following diagram made in this office was constructed. The letter stated in substance that:

"The top of the soil is red clay, but I don't know whether it reaches the bottom of the well or not.
"The town is on a side hill sloping towards the river which curves around it.
"Nearly everybody in town carried water from this well or from a spring down the river a few rods.
"I made the hotel keeper clean up the place last spring, and it was desperately dirty, but I knew nothing of the condition of the well."



Typhoid Fever at the State House of Correction, at Ionia.

The Detroit Tribune of Nov. 10, 1894, contained a notice of an outbreak of typhoid fever at the State House of Correction, and the death, from that disease, of Dr. Wright, Assistant Physician of that institution. A portion of the notice read as follows:

"Ionia, Mich., * * * . Dr. W. George Wright, Assistant Physician at the State House of Correction, died at noon to-day, after several weeks of illness with typhoid fever."

On receipt of this information the Secretary of this Board immediately wrote to both Dr. R. Logan, Health Officer of the city of Ionia, and to Otis Fuller, Warden of the Ionia State House of Correction, asking for information as to the circumstances of the outbreak, and requesting them especially to answer the following questions:

"1. Did Dr. Wright eat his meals at the prison?

"2. Did he sleep in the prison?

"3. Did he drink water from the prison water-supply? If he neither ate, slept, nor drank water from the prison water-supply, please state where he took his meals and lodged.

"4. Are there now, or were there prior to Dr. Wright's sickness, any cases of the disease in the prison?"

Dr. Logan replied that the Prison was one and one-half miles beyond the city limits, and therefore out of his jurisdiction; and the following letter was received from Warden Otis Fuller:

"DEAR SIR:—In reply to your favor of yesterday, Dr. Wright roomed and took his meals at the prison, but was down town every day and also drank water outside. Our water supply comes from a spring of seemingly pure water in the prison garden 40 rods from the prison. About ¼ mile from the prison spring there were three cases of typhoid fever and one death, and the passages from the sick were carelessly thrown where the rain would wash them into the well from which the family got their water. We have thought it possible that our spring was contaminated from this well, although the distance, in the judgment of some, precludes such a possibility. We had the well thoroughly disinfected and filled up although it was on private property and the owner denied our right to do so. The sickness above referred to was about a month before we had any cases at the prison. Two inmates came down with typhoid fever about the same time Dr. Wright was taken sick. Both cases were mild and one has recovered. The other was nearly recovered when he disobeyed the doctor's orders by overeating and overexertion and has had a relapse. The sanitary condition of the prison seems to be good, we have kept the sewers flushed often, and as soon as we discovered typhoid fever we commenced at once to boil all the water used in the prison and have had no new cases for six weeks. We are still using boiled water for drinking purposes. I drank large quantities of the water, probably twice as much as Dr. Wright did, and am still alive. Twenty-two officers boarded here and drank the water freely with no bad results, while one of the officers and his wife who boarded outside the prison had typhoid fever, the officer in a mild form and the wife severe. His wife took no meals and drank no water here."

Typhoid Fever in Marquette.

Two outbreaks of typhoid fever in Marquette in 1894, were reported to this office, resulting in a total of 5 cases and two deaths. The source of contagium in the first outbreak was not given. The second outbreak of this disease in 1894 started Nov. 12, and continued until Mar. 12, 1895, which resulted in 22 cases and 2 deaths. The majority (19) of these cases occurred in 1895, but as the source of the contagium of the disease was plainly in 1894, the correspondence relative to the same, and the diagram which accompanied the correspondence are given herewith.

April 27, 1895, a letter and diagram were received at this office from the health officer of Marquette, Dr. F. Harkin, who states that the source of contagium was probably the city water supply. His letter is as follows:

"A recent epidemic of which final report has been forwarded, has raised the question of possible contamination of our water supply. The issue is an important one as it involves the question of extending our intake pipe to a point beyond possibility of sewer-contamination. By a diagnosis of exclusion I could not otherwise than attribute our epidemic to our water supply.

"Ordinarily (as might be concluded by reference to accompanying diagram) one would not expect pollution from sewage—but just preceding the outbreak and during the worst of it, violent storms succeeded each other at short intervals, keeping the harbor waters in continual ferment by the heavy seas pouring over the break-water, and doubtless generating currents which may have carried sewage outside break-water and to our intake pipe. Besides sewage would not require to go to end of break-water to get out-side harbor for I recently discovered a passage-way 20 to 30 feet wide, where break-water leaves the land. (See chart.)

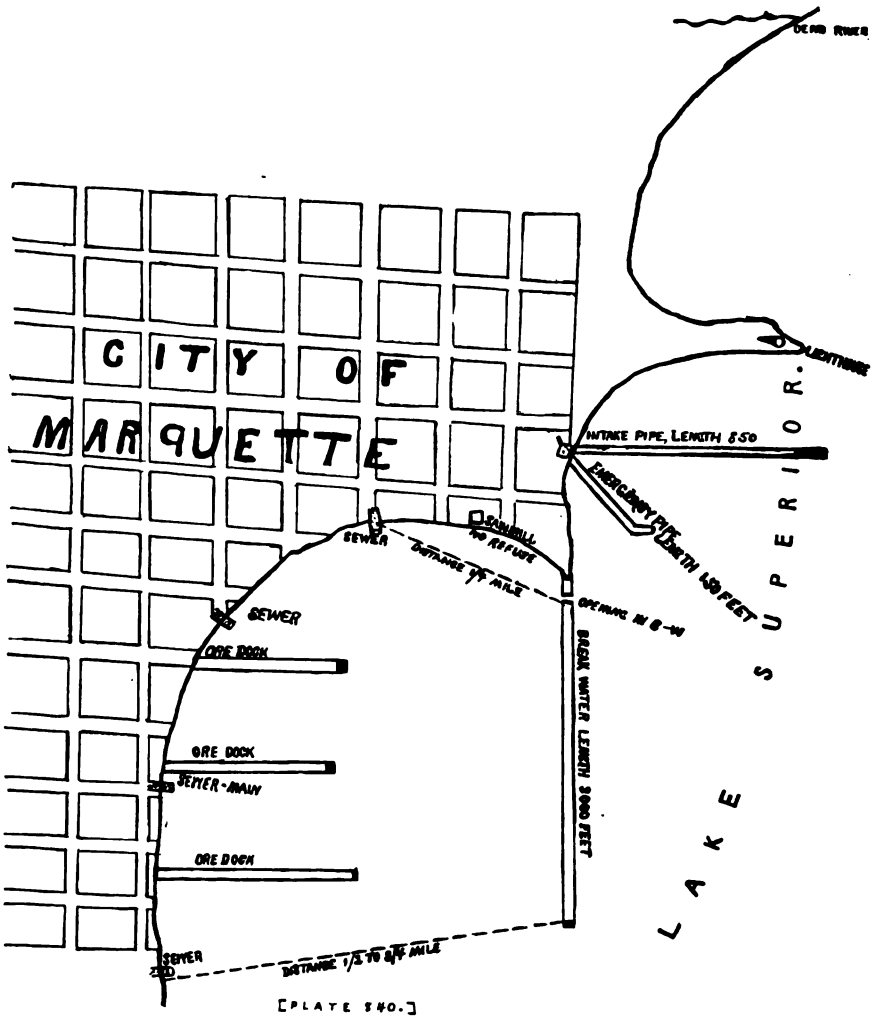
"Now, the government has already begun a work of reconstruction upon this break-water, whereby there will be little, if any, breaking of seas into the harbor: so that with repair also, of break in proximal end of break-water, think you that we might not delay immediate action as to intake pipe and let it go another season, in the meantime, making analysis of water, at different times and under different conditions.

"In our new City Hall, two large, commodious and well appointed rooms have been set apart for my use. Am fitting up a small laboratory for chemical analysis and would request you to direct me to some literature, detailing best, simplest and most practical methods of detecting sewage contamination. Kubler and Wauklyn probesses are perhaps too complicated for mere approximate results, yet of course, I should like absolutely accurate methods."

The following reply by the Secretary, was sent from this office, May 3, 1895, to Dr. Harkin:

"Some years ago I observed the opening in the break-water near the water works which permitted the sewage-contaminated water from the harbor to go out toward the intake pipe. At that time the intake pipe was much nearer the shore than it now is. But I think it very probable that the sewage-contaminated water sometimes reaches the end of the intake pipe. I think you should make a careful record of every case of typhoid fever, its location, surrounding local conditions, and especially the source of the drinking water used just before the outbreak of the case. Having before you such records, you would be enabled to judge of the necessity of extending the intake pipe.

"Chemical analyses are out of date as an indication of the presence or absence of the cause of typhoid fever. Bacteriological and biological tests are now demanded, such as are being made at the State Laboratory of Hygiene at the University of Michigan. A visit to that laboratory and a study of the work being done there would be a useful preparation for any one who wishes to examine drinking water."



[PLATE 840.]

Typhoid fever at McBain village, Missaukee Co.

July 30, 1894, the first report of an outbreak of typhoid fever at McBain village, Missaukee Co., was received at this office, from S. D. Yerrington, M. D., the health officer of that locality. The outbreak finally resulted in 18 cases and three deaths, and continued from July 10 to Nov. 13, 1894.

The first case seems to have been traced by the health officer to contaminated water; but several of the following cases were so widely spread and with no apparent sources of contamination, that health officer Yerrington requested that this Board send some competent person to look into the matter and discover if possible the source of the infection. This the State Board of Health was unable to do, but the Secretary urged upon Dr. Yerrington the necessity of boiling the water, disinfecting the excreta of persons sick, etc.; and sent him the pamphlets published by this Board relative to typhoid fever. The outbreak seems to have continued without evidencing a more definite source of contagium until Oct. 22, when, in his letter to this office the health officer attributes the scattered cases of typhoid fever to contaminated milk. A portion of the correspondence. from Dr. Yerrington, and a copy of his diagram of the source of infection of the first cases here follow. Relative to the first cases, which he attributes to contaminated water, Dr. Yerrington sent the following letter, enclosing the diagram (304) which follows it:

"This is the same family of which I have reported before as being so obstinate about that old well When the first one was removed by the board he transferred his allegiance to another one on the north. side of the same barn and only a few feet removed from it; and now for a time has been using from a well left on the premises of a hotel burned this spring but which about two weeks ago was also discontinued and covered from the public. I think this family the only one who have used from this well for family purposes since the burning of the hotel. I did not know that they were *drinking* from it or I should have interfered. It was left so exposed and there was so much litter and garbage left on the ground around, that I had no idea that they would use from it, and I can find no other means of contagium. A livery barn only about 40 feet south and the hotel barn only 25 or 30 feet west; also a privy. You will see by the accompanying diagram that the probability is strong that *the well* is the source of contagium."

Relative to others of the cases, the source of contagium of which he attributes to contaminated milk, Dr. Yerrington says:

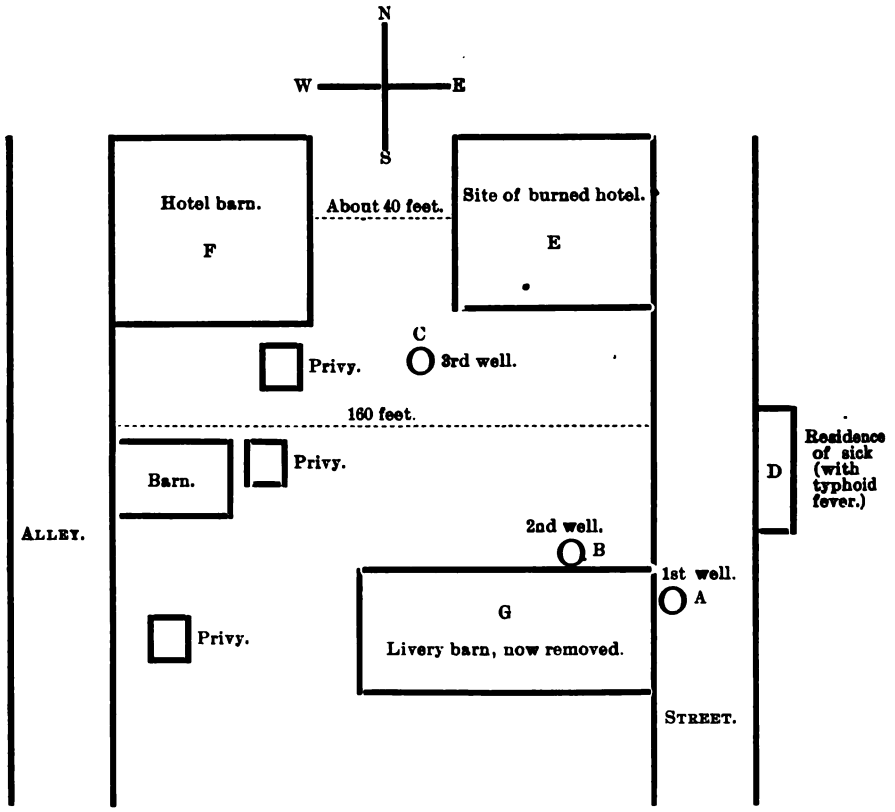
"I think the prevalence of 'typhoid fever' in this locality, and the whole country, due to the fact that the long drouth of the past summer has dried up many of the usual water supplies for the cattle running at large, and in consequence, the milch cows have been compelled to drink water from places usually thought unhealthy. I myself remember to have seen cows drink water from low places, and swamp holes, that could not be otherwise. And, in speaking to others, the same has been observed by them. I remember to have traced a case of the fever last summer (John Shanks), reported to your board as originating in bad milk, caused by drinking milk from cows whose only water supply was from a swamp-hole by the roadside in the township of Highland.

"Some of my patients could not, in my opinion, have received their infection in any other manner. *Some* of them doubtless from very bad wells."

Typhoid fever in Marine City. Analyses of Water Supply.

The report of this outbreak is printed on page xlvi and xlvii of this report.

Diagram of Source of Contagium of Typhoid Fever at McBain village, Missaukee County.



A. Well where case first got water. It was discontinued and covered.
B. Well to which case went after well A was covered up and discontinued.
C. Well surrounded by garbage, litter and wreck of burned hotel from which case was drinking water at time of report.
D. Residence of cases.
E. Burned hotel.
F. Hotel barn only about 25 or 30 feet west from well C, where patient was getting his drinking water.
G. Livery barn about 40 feet south of well C.

Outbreaks of Typhoid Fever Attributed to Defective Drainage or Sewerage, Filth or Unsanitary Conditions, Colds, Etc.

The following are a few extracts from reports of health officials, with the names and jurisdictions subjoined, relative to cases of typhoid fever attributed to defective drainage or sewerage, unsanitary conditions, etc.

Outbreaks Attributed to Defective Sewerage and Drainage.

"Improper drainage."—*L. E. Lonsbury, Clerk, Alaiedon Tp., Ingham Co.*

"Contaminated water and defective sewerage."—*R. Logan, M. D., Ionia.*

"Impure water—defective sewerage."—*J. H. Hudson, M. D., Negaunee, Marquette Co.*

"Stagnant water in cellar."—*Elmer C. Nolan, Clerk, Edenville Tp., Midland Co.*

"Bad drainage."—*J. K. West, Clerk, Maple Grove Tp., Saginaw Co.*

"From a sewer opening to cellar."—*C. M. Freeman, M. D., Laingsburg, Shiawassee Co.*

Outbreaks Attributed to Filth and Unsanitary Conditions.

"Probably from lack of local sanitat on."—*Jno. D. Greenamyer, M. D., Niles, Berrien Co.*

"Probably from filthy surroundings and bad water."—*A. B. Clark, M. D., Clayton Tp., Genesee Co.*

"Unsanitary conditions about premises or drinking water from well in which were found dead frogs and toads."—*Noah Bates, M. D., Flint.*

"The fever developed from filthy surroundings."—*Richard H. Wood, M. D., Vienna Tp., Genesee Co.*

"Unsanitary conditions of Maple River."—*Martin W. Coon, H. O., Washington Tp., Gratiot Co.*

"Improper sanitary conditions."—*John Risdell, Clerk, Sebawaing, Huron Co.*

"Dirt and beer."—*G. W. Faulkner, Clerk, Ionia Tp., Ionia Co.*

"Filthy condition of premises."—*A. M. Martin, M. D., Odessa Tp., Ionia Co.*

"In my opinion, bad sanitary condition of house."—*Wesley D. Smith, Rives Tp., Jackson Co.*

"From working in filthy ditch, cleaning it out."—*C. D. Hubbard, M. D., Sandstone Tp., Jackson Co.*

"From other sources of filth in Pinckney."—*C. D. Hubbard, M. D., Sandstone Tp., Jackson Co.*

"Filthy surroundings."—*J. W. Nixon, M. D., Raisin Tp., Lenawee Co.*

"Unsanitary conditions of house."—*Wm. R. Stringham, M. D., Millbrook Tp., Mecosta Co.*

"Improper sanitation."—*Wm. E. Sitzer, M. D., Ida Tp., Monroe Co.*

"Bad surroundings."—*E. J. Allen, M. D., Golden Tp., Oceana Co.*

"Bad hygienic surrounding."—*C. P. Brown, M. D. Spring Lake, Ottawa Co.*

"Filthy water-closet."—*David D. McNaughton, M. D., Argyle Tp., Sanilac Co.*

"By shallow well and filth not properly taken care of."—*James Bentley, H. O., Springwell Tp., Wexford Co.*

Relative to an outbreak of typhoid fever in Baldwin village, Lake county, which occurred Sept. 6, Henry Rowe, health officer, on his final report, Nov. 9, 1894, said:

"Too much filth, soap-suds, etc., around and leachings in the well which is about 16 feet deep."

Again on his Record, relative to the same outbreak, Health Officer Rowe stated:

"Caused by too much filth too near the well. I believe the nuisance was very great near the well."

Typhoid fever in Walker Tp., Kent Co., attributed to Unsanitary Conditons.

In an outbreak of typhoid fever in Walker Tp., Kent Co., which resulted in 7 cases and 4 deaths, the health officer and attending physician seem to agree in attributing the disease, primarily, to the filthy and unsanitary condition in which the patients lived. Health Officer Tucker says, in his final report, that the origin of the disease was "Impure water and possible hog swill."

September 30, 1894, the health officer makes a report of other cases and encloses with it a letter from Dr. J. W. Riecke of Grand Rapids, who was called to attend one of the cases. In a note which accompanied his report, the health officer said:

"I will enclose the doctor's letter as the cause of sickness is plainly told in that. All cases reported are from the more ignorant classes. They don't have any regard for sanitary conditions."

Dr. Riecke's letter which was made a part of Health Officer Tucker's report was as follows:

"Your postal received to-day and can say that this woman lived right in front of the plaster mills up hill among those Poles. She was sick about three weeks commencing about Sept. 5, 1894, but was sick about 2 weeks before I was called. I was called Sept. 19, 1894—Sept. 21, I diagnosed typhoid fever and notified City Health Board in this city, not knowing that each township had a health board; so I notified you Sat. 22, '94, but the woman died at 3 o'clock in the morning Sept. 25, 94. I don't see how she lived as long as she did in such a place as it was, with not fairly intelligent persons around her to do anything for her and in such a dirty hovel as hers was."

Outbreaks of Typhoid Fever Attributed to Exposure, Overwork, etc.

"Overwork and exposure."—*G. L. Fenton, M. D., Paradise Tp., Grand Traverse Co.*
"Overwork."—*H. B. Rathbun, Paris Tp., Kent Co.*
"Exposure."—*E. D. McCune, Clerk, Jasper Tp., Midland Co.*
"Overwork and neglect."—*E. B. White, Rose Tp., Ogemaw Co.*

Typhoid Fever in Riley Tp., St. Clair Co.

September 6, 1894, an outbreak of typhoid fever was reported from Riley Tp., St. Clair Co., by the health officer, C. E. Greene, M. D. The outbreak resulted in 4 cases, no deaths, and the source of contagium was reported as the result of cases of typhoid fever occurring in the same houses five and eight years ago respectively. In a letter dated Oct. 10, 1894, Dr. Greene states relative to the source of contagium:

"Finally it was found that there had been a fatal case of typhoid in the same house five or six years ago. The second case I report is a young lady whose father had the fever eight years ago. Can it be possible that the premises would remain infected for so long a time?"

The Secretary of this Board replied to Dr. Greene's letter on Oct. 10, as follows:

"I do not think it has been determined just how long the bacillus of typhoid fever will retain its vitality under favorable conditions, but it is possible that they may remain active for the time which you mention. If the discharges from the bowels from former patients were deposited in the privies, or upon the ground, or buried in the ground without having been properly disinfected, it is possible that the contagium may have found its way into the present water-supply of the families in which the disease is at this time, even after the expiration of the periods of time named. I would be thankful for additional account of the conditions there in each case; kind of privy, its depth, situation, relation of to well, whether any dust from human excreta could have got on food used, or into open well, etc."

Dr. Greene replied to the letter from the Secretary of this Board as follows:

"In the first instance I can not learn the exact facts, the family having moved away. The nearest neighbors seem certain there was no systematic disinfection nor cleansing of the house after the death of the patient. They think the discharges from the bowels were thrown into a shallow privy vault without disinfection. This vault was about 100 feet from the present water supply, a well in which the water has been extremely low this season. The privy vault was closed a year or two ago. The soil is a hard clay and the surface of the ground so level that I cannot determine from inspection which way the surface water runs.

"In the second case the present patient's father had an attack of the typhoid fever eight years ago. The discharges from the bowels were not disinfected but were carried to what the nurse thought a safe distance, probably ten rods, and thrown upon the ground. Here, too, the surface of ground is quite level but, I think from appearances, the surface water is quite as likely to run toward the well as away from it."

FLIES AND TYPHOID FEVER.

Flies as a means of spreading typhoid fever germs is certainly by no means an impossible method of infection. In response to a card of inquiry from this office, John Clarke, Clerk of Whitefish Tp., Chippewa Co., reports an outbreak of typhoid fever which occurred between Aug. 30, and Oct. 9, 1894, and which resulted in 22 cases and 1 death. He attributes many of the cases to the fact that swarms of flies passed undisturbed between the privy, which had been contaminated with the excreta of a typhoid fever patient, and the kitchen and dining room of a boarding house, the flies lighting and crawling over the food on the table, thereby infecting it with typhoid germs. In his first letter dated Sept. 27, 1894, he says:

"The disease was confined principally to one boarding house occupied by Swedes, and I think their manner of living had something to do with it. On several occasions I have noticed there were no precautions taken to kill off or keep the swarms of flies from crawling all over their food. One case of typhoid fever to have visited their water closet, with the assistance of those flies passing from there to the kitchen, I have no doubt would have been sufficient cause."

Again on January 15, 1895, Mr. Clarke wrote to this office relative to typhoid fever in Whitefish Tp., and he again stated his opinion as to the infection of typhoid fever cases through the flies. His letter was as follows:

"I wish to explain to you that Emerson, the place where the typhoid fever epidemic occurred is low land near the mouth of the Taquamenaw River, and very little of the original timber is cut away. The water is good and the place has heretofore been considered healthy. The attending physician could not account for the disease.

"It is my impression that the *Flies* did it. I noticed that they had free access to the privy, kitchen and dining-room and were so thick on the table at times that it was difficult to tell what the dishes were composed of."

The Secretary of this Board wrote Mr. Clarke on Jan. 26, 1895, making some inquiries, enclosing blanks, instructions, etc.; the portion of his letter relating to the means of carrying the contagium was as follows:

"I notice what you say in relation to the flies, and it is an interesting suggestion. If the excreta was where the flies could go from it to the table, I think it quite possible that may be the explanation of the spread of typhoid fever; but the evidence would be more satisfactory if the origin of the first case were to be accounted for."

Nothing relative to the origin of the first case was reported from the locality.

"YELLOWS" IN PEACHES ALLEGED TO BE A CAUSE OF TYPHOID FEVER.

In an outbreak of typhoid fever in Salem Tp., Allegan county, which resulted in 23 cases but no deaths, and which lasted from Aug. 14 to Nov. 26, 1894, the health officer H. W. Heasley, M. D., stated in his "final report" dated Nov. 28, 1894, that the disease was caused by "Yellows in Peaches." On Dec. 8, the Secretary of this Board wrote Dr. Heasley as follows:

"On your final report of an outbreak of typhoid fever in Salem Tp., (dated Nov. 27) I notice you say: 'I am satisfied that most of the cases were caused by yellows in peaches and can furnish evidence which ought to be convincing.'

"I shall be glad to have any and all 'evidence' which you may have which will tend to show that typhoid fever has been caused by yellows in peaches."

December 10, 1894, a letter was received at this Office in response to the Secretary's inquiries, in which Dr. Heasley sets forth some evidence to show that yellows in peaches was the cause of typhoid fever. The letter was as follows:

"Aug. 14, 1894, I was called to ——'s and found him, his wife, his oldest daughter of 7 years and his sister-in-law suffering from typhoid fever. I searched for the cause, but was unable to ascertain it. I called in the physician on the board of health from another township, and he could draw no definite conclusion. They told me they had been working very hard among the peaches which did not seem to agree with them. The four mentioned were engaged in the orchard, and all came down at the same time. The mother-in-law and her daughter came to take care of them and at the same time they employed a hired man. The first two took care of the sick and the latter worked in the peach orchard.

"The hired man took the fever and the other two did not.

"I took the necessary precautions to prevent its farther infection and continued to search for its cause but was fairly repulsed.

"At this juncture my brother, who had many peaches infected of yellows came down with the same fever. I searched for cause but found none. He had not been away from home. He remembered, however, that a short time previous he had eaten 15 peaches with yellows and had not felt well since. This was told without my solicitation. I did not even then suspect the peaches. His youngest girl was also with him that afternoon and came down shortly after with the fever. None of the others were taken down with it and there were four other members of the family and a hired man. The same day I was called to my brother's neighbor on the west and found his boy infected as the others. Mr. B ——, for that was his name, had many peaches with the yellows and his boy had put some in his pocket. These he gave to Mr. ——'s boy, next east of my brother and the following day, that is eleven days from the time of eating, called me in and he also was developing that 'awful disease' as they put it.

"It now began to dawn on me that the peaches were responsible for all this trouble.

"I reasoned thus:—Mr. —— was peach commissioner and refused or at least neglected to cut the condemned trees because he said he could cure the yellows with salt; all came down who worked in the orchard, and only one who did not, that being a child who played and sometimes slept with the diseased.

"Mr. B —— had many trees with the yellows and my brother was especially fond of these peaches, while the —— boy had eaten nothing off the farm for a month except the peaches given him by the B—— boy. These families each had drive wells and so positive was I that they were not infected from that source that I repeatedly drank from each well.

"At this time two children in an adjoining town were poisoned from peaches with yellows and one died. I did not learn what were the symptoms.

"Jake ——'s wife took sick, then himself and immediately his oldest boy about 8 years of age. No cause discovered. I now looked for a peach history but got none. In a few days a good responsible neighbor told me that he was in the orchard of his father-in-law and saw them eating peaches with the yellows. Soon another son-in-law came down, but the father-in-law's family did not get it. Neither did they use the peaches.

"One patient was at Grand Rapids and also ate peaches with the yellows. I am undecided in his case. Another had eaten only a few, 17 days previous. He was four years old and had not been off the farm. It was the only case in the family.

"Finally—I am very fond of peaches with yellows myself. There are two varieties, a light and dark colored; I had often eaten the red, but never the dark or purplish variety. There were many of that kind here this fall and for personal reasons think they are most poisonous. One day while at home I ate 10, I began to feel miserable. Was nauseated and distressed, stomach and bowels became flatulent and by times painful; it was about noon when I ate them and the next day I felt no better. I was chilly, had no appetite, suffered headache, diarrhea, vomited, and could scarcely ride.

* * * * * * * * * * * *

"Now, I could cite you to 10 other cases where they suffered similar symptoms but did not develop the fever. They had eaten peaches. I used calomel and followed with carb. acid, corrosive sub. and thymol.

"Finally, almost every case (all except one) was in the northwest corner or quarter of the township and one which was down near the center had eaten peaches from that section and if I remember correctly he said he had 'cooned' them. In this one-fourth of the township nearly all of the orchards are located."

To this letter the Secretary of this Board replied, December 14, as follows:

"Accept very cordial thanks for your letter of Dec. 10, in which you recite your observations with reference to the causation of typhoid fever by peaches infected with 'yellows.' The facts contained in your letter are interesting and may be valuable contributions to the etiology of typhoid fever.

"I am interested in the alleged cause of the typhoid fever, and would be glad to learn the facts regarding the possible contamination of the *water supply*. Prior to this outbreak, can you not think of some way in which the bowel discharges from a typhoid patient have been deposited in some vault convenient to one or more wells? There is good reason to suspect the water of a well whenever a vault is situated within one hundred feet of it, and especially if the soil is porous. It is quite frequently the case where a 'walking' typhoid fever patient visits a number of privies in a district and *infects them all*, and the contents from these privies may contaminate a number of wells in the same district. How isolated privies may become infected is illustrated by the case of a peddler sick with typhoid fever, admitted into Bellevue Hospital, New York city, who is reported to have said that while suffering with the diarrhea in the early stages of his disease, he had visited between forty and fifty privies along his line of travel. Of course this fact *may* not be applicable to your outbreak, but it shows how isolated privies (and consequently some wells) may become contaminated. As nearly all typhoid fever can be traced to some contaminated water-supply, it would be well to give this a second consideration.

"I shall want to publish your letter, but, before I do so, I should like to be able to give the facts relative to all other possible sources. Will you kindly consider the facts I have placed before you, and see if you cannot in some way think where this typhoid fever can be traced to contaminated water."

December 26, Dr. Heasley wrote to this Office that he had been so busy as to leave him no time for looking up further the source of contagium of this outbreak, but that he would do so in the course of a few days.

Nothing further was heard from Dr. Heasley on the subject of typhoid fever and peach yellows, and it is to be regretted that with such an excellent opportunity for the study of possibly new facts in the etiology of typhoid fever, that the outbreak was not positively traced to its source.

Medical Attendance on an Indigent Person, Sick with a Dangerous Communicable Disease, is a Charge Upon the County.

During the outbreak of typhoid fever in Duncan Tp., Houghton Co., previously mentioned on page 299 of this article, a physician from a town 40 miles distant was called upon to attend, among other patients, the case of an indigent person afflicted with typhoid fever, who finally recovered. A bill of $2.00 per visit, amounting in all to $33.00 was presented to the Board of Supervisors, who cut it down to $16.00, which the physician declined to accept, and laid the matter before the Secretary of this Board, asking for advice, and what the custom was in regard to such matters. The reply of the Secretary (printed on pages liv–lv of this Report) is a plain statement of the law in such cases. Also on page 289 of the Annual Report of this Board for 1894, is a plain statement of the duties of the Boards of Supervisors of counties relative to the pay for the care and medical attendance of an indigent person sick with a dangerous communicable disease.

The Legislature has made provision for the payment of just claims for the care and medical attendance of indigent persons sick with communicable diseases, (§1647 Howell's Annotated Statutes), and the Supreme court of Michigan in 3rd Michigan, 475, has sustained the law. It therefore seems as if there could be no doubt of the liability of a county in such cases.

It is desirable that the cases of indigent persons sick with dangerous communicable diseases should receive proper medical treatment and attendance, and especially important that the rules of the State Board of Health relative to isolation and disinfection be carried out thoroughly, for the safety of the community. Persons who have sufficient means to provide medical attendance for themselves are very likely to have knowledge of sanitary laws, or at least to receive information on the subject, and if anyone would be likely to obey the sanitary rules it would be this class; but the poorer and possibly more ignorant, those who cannot afford to be sick, and who know and care little for sanitary laws, are much more likely to spread the disease. Instances are numerous where walking cases of typhoid fever have infected districts for miles, by using the privies, thereby rendering persons in the districts so infected very liable to typhoid fever. It is true that seldom is a physician called in to see a mild case and so it is probably impossible to give all of those cases attention such as would secure safety to the neighborhood, but where the case requires the attendance of a physician, such attendance should be fairly paid for, else it will become impossible to secure it, for no physician is

likely to go to a great disadvantage to care for a case of dangerous communicable disease when he is practically sure that his services will be only half paid for, or not paid for at all. In cases of typhoid fever it is especially desirable that the excreta of all patients should be disinfected, and if no physician can be secured the danger to the community is likely to be serious. Under such circumstances, a physician's compensation should be adequate and certain. The law is plain; but the action of boards of supervisors has not always been in accordance with what seems to be good public policy.

MEASURES TAKEN TO RESTRICT TYPHOID FEVER.—RESULTS.

In studying the effects of efforts of health officers for the restriction and prevention of typhoid fever, and of the difficulties experienced by some of them in carrying out the methods recommended by the State Board of Health to that end, it is interesting to note the difference in the reported numbers of cases of sickness and of deaths, from this disease, in outbreaks where local health officers were enabled to enforce isolation and disinfection, and in those outbreaks in which, for any reason, those restrictive measures were neglected.

Table 8, and the diagram—Plate 841—which graphically illustrates it, exhibit the difference, and show that in outbreaks relative to which the reports state that isolation and disinfection were enforced, there occurred 2.81 cases and .32 of one death per outbreak; whereas in those outbreaks in which isolation and disinfection were neglected there were 4.62 cases and .52 of a death per outbreak, or nearly twice as many cases and deaths in outbreaks in which isolation and disinfection were neglected as there were in those outbreaks in which the restrictive measures were enforced.

Table 9 indicates that in 1894, there was a saving of 217 cases of sickness through isolation and disinfection, but that there was no saving of life. This table is accurately compiled from the reports received at this office, but it is necessarily incomplete; for instance, in 1894, in the 47 outbreaks in which isolation and disinfection were both neglected there were 4.62 cases and .52 of one death per outbreak, and if all the 596 outbreaks had been neglected, with the same result, there would have occurred 2,754 cases and 309 deaths, which, if compared with the whole number of cases and deaths reported (2,537 cases and 405 deaths), indicate a saving of 217 cases, but a loss of 96 lives. This loss of life is undoubtedly not true, for it is not in harmony with past experience, whereby it has been shown that there has been, in each of the years, 1890, 1891, 1892, a saving of both cases and lives from typhoid fever, and in the years 1893 and 1894 a saving of cases of sickness from that disease, when studied in the same manner as in Table 9. We must therefore look for the discrepancy in the manner of compiling the reports of the health officers, or in the reports themselves, the latter of which seems to yield the most reasonable explanation. An examination of Table 8, shows that there were 410 outbreaks of typhoid fever wherein isolation and disinfection were doubtful, and that the numbers of deaths per outbreak were greater than in those outbreaks where the restrictive measures were neglected, viz. in the doubtful outbreaks there were .79 of a death to the outbreak, or .27 of a death more in the doubtful outbreaks than in the neglected ones. (The average number of cases to an outbreak, however, is

less. This discrepancy is, apparently, due to the fact that in some of the outbreaks in which the action taken is in doubt—not clearly reported—only the fatal cases were reported.)

It has been the practice in the office of the State Board of Health to consider as doubtful: all cases concerning which the health officer has made an uncertain report; all those which may have been reported as unknown; all those cases in which the questions of the State Board of Health have been left unanswered; also all those instances in which the thoroughness of isolation and the completeness of disinfection are questioned. Column 2 of Table 8, shows that seven-tenths of all the outbreaks and cases, and eight-tenths of all the deaths reported to this office, are so incompletely or unsatisfactorily reported as to be of a necessity considered as doubtful. Of the cases and deaths, which from inaccuracy or incompleteness of the reports of the health officer are necessarily placed under the head of "doubtful," it is reasonable to suppose that had the statements been more complete and accurate, at least three-fourths of the instances would have been reported as having been neglected.

If two-thirds of the outbreaks, cases and deaths which appear in the "doubtful" column were transferred to the "neglected" column, where it is conservatively within the law of probabilities to place them, we would have in that column two-thirds of 410 outbreaks, 1,787 cases and 324 deaths, or, 273 outbreaks, 1,191 cases and 216 deaths, transferred to the neglected column, which with the 61 outbreaks, 282 cases and 32 deaths already there, would make a total of 334 outbreaks, 1,475 cases and 248 deaths, an average of 4.4 cases and .74 deaths per outbreak. If this is done and we multiply the number of all outbreaks (596), by 4.4 cases and .74 deaths, the ratios of cases and deaths respectively to the outbreak where isolation and disinfection is neglected, we have 2,622 cases and 441 deaths which would have occurred had all outbreaks been neglected. By deducting from these the numbers of cases (2,537) and deaths (405), which occurred, a saving is shown, of 85 cases and 36 deaths by isolation and disinfection.

According to the data in the office of the State Board of Health, Table 9 shows the numbers of cases and lives probably saved from typhoid fever, while the following Exhibit (II) shows the number of lives which probably would have been saved had isolation and disinfection been enforced in every instance. But the data is very defective, as is explained in other paragraphs.

Exhibit II, indicates the number of cases and lives that *would have been saved* from typhoid fever had isolation and disinfection been observed in every instance. The same conditions which make the preceding study of the "doubtful" instances necessary, are present in Exhibit II, and the results fall as far short of the probable saving. It is shown in Table 8, that in 1894, 596 outbreaks of typhoid fever, resulting in 2,537 cases and 405 deaths were reported. In the same table it is also shown that in 47 of those outbreaks in which isolation and disinfection were both enforced there occurred 2.81 cases and .32 of one death per outbreak; now if all the 596 outbreaks which occurred in 1894 had been restricted with similar result *i. e.*, 2.81 cases and .32 of one death per outbreak, there would have occurred 1,675 cases and 191 deaths in the State, which, deducted from the 2,537 cases and 405 deaths which occurred, showed that 862 cases and 214 deaths occurred which should have been prevented if isolation and disinfection had been enforced in all the outbreaks.

TABLE 8.—*Typhoid Fever in Michigan in 1894: Exhibiting the Average Numbers of Cases and Deaths per Outbreak:—(1) In all the 596 outbreaks reported; (2) in the 410 outbreaks in which it is doubtful whether or not Disinfection or Isolation was enforced; (3) in the 41 outbreaks in which Disinfection was enforced and Isolation was doubtful; (4) in the 4 outbreaks in which Isolation was enforced and Disinfection was doubtful; (5) in the 4 outbreaks in which Isolation was enforced and Disinfection was neglected; (6) in the 29 outbreaks in which Disinfection was enforced and Isolation was neglected; (7) in the 61 outbreaks in which both Isolation and Disinfection were neglected; (8) in the 47 outbreaks in which both Isolation and Disinfection were enforced.*

	(1) All outbreaks. (596 outbreaks,*)		(2) Isolation or Disinfection or both not mentioned, or statements doubtful. (410 outbreaks.)		(3) Disinfection enforced—Isolation doubtful. (41 outbreaks.)		(4) Isolation enforced—Disinfection doubtful. (4 outbreaks.)		(5) Isolation enforced—Disinfection neglected. (4 outbreaks.)		(6) Disinfection enforced—Isolation neglected. (29 outbreaks)		(7) Isolation and Disinfection both neglected. (61 outbreaks.)		(8) Isolation and Disinfection both enforced. (47 outbreaks.)	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals....	2,537	405	1,787	324	225	23	9	1	24	5	78	5	282	32	132	15
Averages..	4.26	.68	4.36	.79	5.49	.56	2.25	.25	6	1.25	2.69	.17	4.62	.52	2.81	.32

* These do not include the cases and deaths in Detroit and Grand Rapids because of the difficulty in determining the beginning and ending of an outbreak in these cities, in which the disease is present in some part of the city nearly all the time.

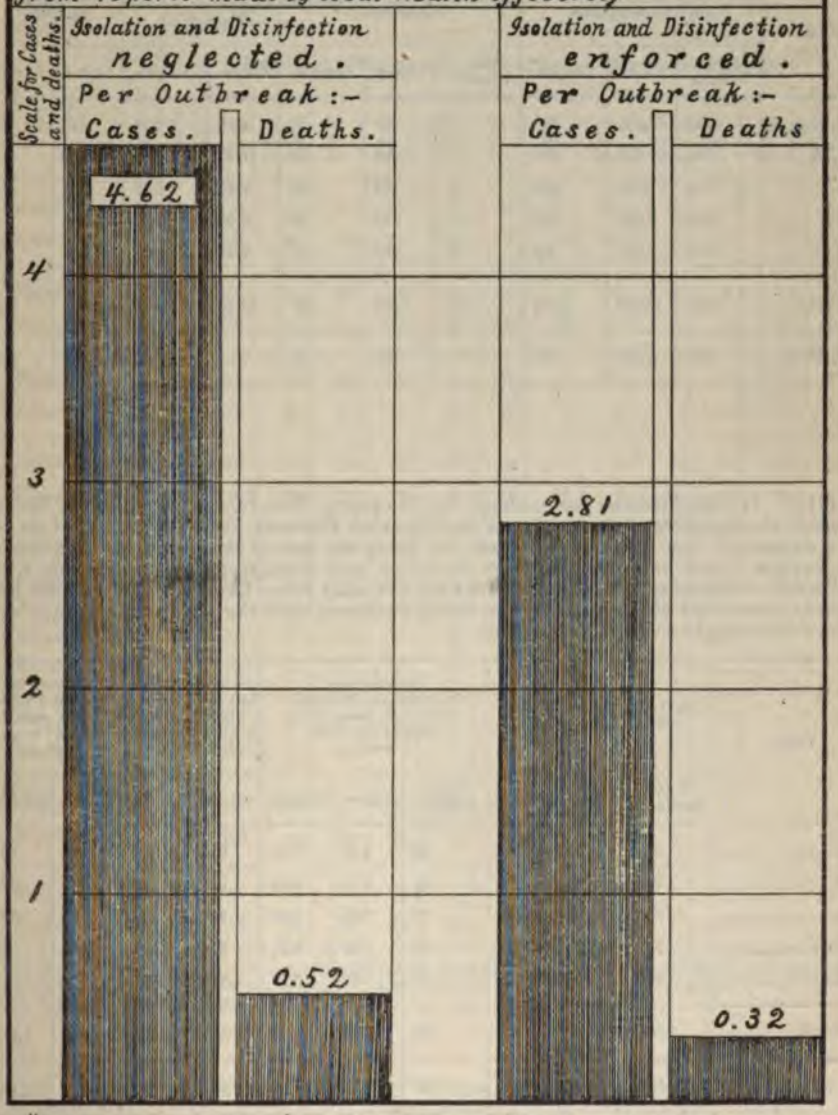
DEFINITION OF THE TERM, "OUTBREAK": An outbreak is considered as the existence of one or more cases of a particular communicable disease within any health officer's jurisdiction, whether city, village or township. All cases of the disease occurring within the jurisdiction during the outbreak are considered as part of the outbreak, unless the contagium cannot be traced to cases within the jurisdiction, and can be clearly traced to cases outside of the jurisdiction, in which instance they are considered as constituting a separate outbreak. When a period of 60 days or over has elapsed since the last case (in a given jurisdiction) died or recovered, the outbreak has been considered ended.

The last four columns of the last line in Table 8 are graphically represented in the diagram, Plate 841.

* In the compilation of the reports for Tables 8 and 9 and the diagram [Plate 841] showing the results by isolation and disinfection, every effort has been made to place the numbers of cases and deaths in each outbreak in the proper columns. If, for instance, there were only one or two cases in an outbreak and the health officer neglected to isolate or disinfect, but for some reason the disease spread no further, the numbers of cases and deaths were placed in the column headed "Isolation and Disinfection both Neglected." If, on the other hand, as often occurs, quite a number of persons are exposed at the same time and place outside the health officer's jurisdiction, and by proper isolation and disinfection he succeeds in confining the disease to the original cases exposed, they are placed in the column headed "Isolation and Disinfection Enforced." If, however, he neglects to properly isolate or disinfect, the whole number of these cases and deaths are placed in the "neglected" column. It is to be regretted that many of the reports received at this office do not state exactly what was done to restrict the disease, or are not sufficiently definite to enable the compilers to decide just what was done, and they are obliged to place all such in the column headed "Isolation or Disinfection or both not mentioned, or statements doubtful."

Isolation and Disinfection Restrict Typhoid Fever.

Typhoid Fever in Michigan in 1894: Exhibiting the Average numbers of cases and deaths per outbreak: in all outbreaks in which Isolation and Disinfection were both Neglected; and in all outbreaks in which both were enforced. (Compiled in the office of the Secretary of the State Board of Health, from reports made by local Health Officers.)*



* *Including the disinfection of the bowel discharges of the patients.*

[PLATE 84.]

TABLE 9.—*Exhibiting for each of the five years, 1890-94, and the average for the period the numbers of Outbreaks, Cases and Deaths from Typhoid Fever represented in the five diagrams for those years, plate 841 being the last of the series, the numbers of Outbreaks, Cases and Deaths where Isolation and Disinfection were Neglected, the averge numbers of Cases and Deaths per Outbreak, and the estimated Cases and Lives saved from Typhoid Fever.*

Year.	All Outbreaks included in the five diagrams.			Isolation and Disinfection Neglected.			Average per Outbreak where Neglected.		Estimated Saving.	
	Out-breaks.	Cases.	Deaths.	Out-breaks.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Lives.
1890	330	1,924	304	53	349	51	6.58	0.96	247	13
1891	541	4,018	607	56	1,196	114	21.36	2.04	7,538	497
1892	524	2,195	416	41	183	38	4.46	0.93	142	71
1893	539	2,255	405	47	240	25	5.10	0.50	494	0
1894	596	2,537	405	61	282	32	4.62	0.52	217	0
Total	2,530	12,929	2,137	258	2,250	260	42.12	4.95	8,638	581
Av. 1890-94	506	2,586	427	52	450	52	8.42	.99	1,728	116

EXHIBIT II.—*Exhibiting for each of the five years, 1890-94, and the average for the period, the numbers of Cases of and Deaths from Typhoid Fever, represented in the five diagrams * for those years, plate 841 being the last of the series, the numbers of Outbreaks, Cases and Deaths where Isolation and Disinfection were Enforced, the probable numbers of Cases and Deaths that Would Have Occurred if Isolation and Disinfection had been practiced in every instance, and the numbers of Cases and Lives that Ought to have been saved.*

Year.	All Outbreaks included in the five diagrams.			Isolation and Disinfection Enforced. Average Cases and Deaths per Out-break.			Probable result had Isolation and Disinfection been Enforced in all instances.		Number of Cases and Lives which should have been saved	
	Out-breaks.	Cases.	Deaths.	Out-breaks.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Lives.
1890	330	1,924	304	38	1.98	0.32	653	106	127	198
1891	541	4,018	607	31	1.74	0.29	941	157	3,077	450
1892	524	2,195	416	35	1.86	0.26	975	136	1,220	280
1893	539	2,255	405	33	1.60	0.24	862	129	1,393	276
1894	596	2,537	405	47	2.81	0.32	1,675	191	862	214
Total	2,530	12,929	2,137	184	9.99	1.43	5,106	719	6,679	1,418
Av. 5 yrs., 1890-94	506	2,586	427	37	2.00	.29	1,021	144	1,336	284

* Diagrams similar to Plate 841, but exhibiting the results for different years, are printed in preceding reports.

AVERAGE DURATION OF TYPHOID FEVER.—FATAL AND NON-FATAL CASES.

TABLE 10.—*Exhibiting by Sex of patient, the average duration (in days) of fatal cases of sickness from Typhoid Fever in Michigan, during the eight years, and during each of the eight years, 1887–94. (Compiled from those reports which stated the length of time the patient was sick.)*

Fatal cases of Typhoid Fever.

Year.	Sex.	No. of cases included.	Duration of Sickness:—Per cent of Deaths in each Period of days.*											
			All cases.	Under 10 days.	10 to 15.	15 to 20.	20 to 25.	25 to 30.	30 to 35.	35 to 40.	40 to 45.	45 to 50.	50 to 55.	55 days and over.
1887.	Males	81	100	10	7	15	21	16	11	12	2	4	1	0
	Females	32	100	31	19	19	16	6	3	0	0	6	0	0
1888.	Males	40	100	20	13	18	23	10	8	0	5	3	3	0
	Females	33	100	24	21	15	12	9	6	3	0	0	9	0
1889.	Males	42	100	17	14	19	7	14	5	7	2	7	0	7
	Females	51	100	18	24	14	16	10	2	6	2	2	0	8
1890.	Males	57	100	19	9	21	23	5	5	7	0	4	2	5
	Females	26	100	19	23	8	8	19	12	0	8	0	0	4
1891.	Males	80	100	14	20	18	23	10	6	5	1	1	0	3
	Females	56	100	20	23	20	11	9	2	5	5	0	0	5
1892.	Males	92	100	23	21	14	13	14	4	3	3		2	2
	Females	60	100	23	18	15	15	7	10	5	5		2	
1893.	Males	94	100	24	15	11	13	11	4	5	3	4	4	5
	Females	84	100	25	30	7	13	7	2	6	7	1	0	1
1894.	Males	89	100	22	17	17	11	13	3	2	5	3	0	7
	Females	80	100	27	22	11	8	10	4	3	8	1	4	3
Av. 1887-1894.	Males	72	100	19	15	15	17	12	6	5	3	3	2	4
	Females	58	100	23	23	14	12	10	5	4	4	1	2	3

* In the head of each column showing the periods of days, the first number is included and the last number is not included; as in column 1, under 10 days includes 0 and 9, in the second period 10 and 14 are included, in the next period 15 and 19, etc.

From Table 10 it may be seen that, of the 575 males who were reported to have died from typhoid fever within the eight years 1887–94, and of which the interval between the day of being taken sick and the day of death was given, the largest per cent of males in any five-year period died in the

two periods under 10 days and 20 to 25 days of sickness, and that 52 per cent were sick twenty or more days before they died; while of the 422 females reported as having died in the same time, 23 per cent of the females died before the tenth day and 46 per cent before the fifteenth day and only 41 per cent were sick longer than nineteen days.

The average duration of the fatal cases in 1894 was in males 23 days, and in females 20.8 days.

TABLE 11.—*Exhibiting by Sex of patient, by per cent of cases which recovered in specified periods of time, the Average Duration (in days) of Non-Fatal cases of sickness from Typhoid Fever, in Michigan, during the eight years and during each of the eight years 1887-94. (Compiled from those reports which stated the length of time the patient was sick.)*

Non-Fatal Cases of Typhoid Fever.														
Year.	Sex.	No. of cases included.	Duration of Sickness:—Per Cent of Cases in each Period of Days.*											
			All Periods.	Under 10 Days.	10 to 15.	15 to 20.	20 to 25.	25 to 30.	30 to 35.	35 to 40.	40 to 45.	45 to 50.	50 to 55.	55 days and over.
1887.	Males	203	100	0	5	6	12	16	15	15	9	6	3	8
	Females	158	100	0	9	9	19	12	17	11	6	4	3	9
1888.	Males	164	100	1	4	13	9	13	15	9	10	9	9	7
	Females	111	100	0	2	7	14	15	15	19	4	8	10	8
1889.	Males	166	100	2	7	13	14	16	14	12	9	6	2	5
	Females	165	100	6	8	9	14	19	12	11	8	2	2	7
1890.	Males	226	100	1	4	7	15	18	19	12	10	5	2	8
	Females	110	100		4	14	16	17	13	14	9	2	5	6
1891.	Males	463	100	3	5	7	16	19	9	11	11	6	3	11
	Females	276	100	2	4	9	14	15	10	14	10	4	5	12
1892.	Males	329	100	2	4	5	16	22	12	12	11	5	2	9
	Females	177	100	2	5	8	15	14	14	9	8	8	4	14
1893.	Males	410	100	2	5	10	17	18	14	10	9	5	3	7
	Females	341	100	2	5	8	17	15	15	14	9	2	4	9
1894.	Males	453	100	2	6	7	14	15	16	13	7	6	3	10
	Females	340	100	2	5	9	14	18	17	11	7	5	4	8
Av. 1887-94.	Males	302		2	5	9	14	17	15	12	10	6	3	8
	Females	210		2	5	9	15	16	14	13	8	4	5	9

* See star note under table 10.

In Table 11 it may be noticed that in *non-fatal* cases of typhoid fever for the eight years, 1887–94, 62 per cent of the males and 61 per cent of the females recovered before the thirty-fifth day of sickness. The average duration was: males 34 days, females 33 days.

The average duration of all cases in 1894, fatal and non-fatal, was: males 32.3 days, females 30.8 days; and for all cases of both sexes, 31.6 days.

AGE OF OCCURRENCE OF TYPHOID FEVER.

TABLE 12.—*Exhibiting, by Sex, the per cent of persons in certain Age-groups sick from Typhoid Fever in Michigan, during the eight years and each of the eight years, 1887–94; also the average age and the number of cases included.* (*Compiled from such reports as stated the ages.*)

Year.	Sex.	Average age of persons sick, Years.	No. of cases included.	Age.—In Periods of Years. Per Cent of Cases in each Period of Age.*										
				All Ages.	Under 10 Years.	10 to 15.	15 to 20.	20 to 25.	25 to 30.	30 to 35.	35 to 40.	40 to 45.	45 to 50.	51 Years and over.
1887.	Males.....	24	316	100	10	10	14	20	17	9	8	4	2	4
	Females..	22	245	100	17	10	20	15	10	10	5	4	3	5
1888.	Males.....	24	310	100	12	13	15	20	11	11	5	4	3	6
	Females..	23	199	100	12	22	20	14	8	5	4	6	3	7
1889.	Males.....	24	362	100	13	11	17	25	10	8	6	3	2	6
	Females..	23	310	100	16	17	20	12	8	7	7	4	4	5
1890.	Males.....	23	325	100	14	12	16	25	16	7	4	3	2	3
	Females..	20	199	100	16	16	24	17	11	6	5	1	2	4
1891.	Males.....	23	893	100	11	11	16	26	17	8	4	2	2	3
	Females..	23	553	100	13	20	21	15	10	6	3	3	3	5
1892.	Males.....	23	† 711	100	15	9	17	21	16	7	6	3	2	4
	Females..	20	† 506	100	22	16	22	13	8	6	4	4	2	2
1893.	Males.....	22	1,073	100	20	10	14	20	18	8	5	2	2	2
	Females..	17	894	100	21	16	19	16	11	5	3	2	3	4
1894.	Males.....	23	813	100	21	12	13	17	13	7	9	3	2	3
	Females..	22	649	100	22	15	18	11	11	7	5	3	3	4
Av. 1887–94.	Males.....	23	600	100	15	11	15	22	15	8	6	3	2	4
	Females..	21	444	100	17	17	21	14	10	7	5	3	3	5

* In each age-group the first-mentioned year is included; but the last-mentioned year is not included.

† In the Annual Report for 1893, the figures given for 1892, in Table 11 (Table 13 in this Report) include only the non-fatal cases of which the age and sex were given; whereas in the reports for 1894-95 *all* cases, both fatal and non-fatal, are included for 1892, as well as for all the other years treated.

TABLE 13.—*Exhibiting, by Sex, the* **Per Cent** *of persons in certain Age-groups who died of Typhoid Fever during each of the years 1892-94; also the per cent the deaths in each group were of all the deaths from Typhoid Fever.*

Year.	Sex.	Average age of decedents. Years.	No. of deaths included.	Per Cent of Deaths in certain Age-groups.*										
				All Ages.	Under 10 years.	10 to 15.	15 to 20.	20 to 25.	25 to 30.	30 to 35.	35 to 40.	40 to 45.	45 to 50.	51 Years and over.
1892.	Males	28	116	100	3	6	18	22	22	8	4	5	3	9
	Females	21	68	100	18	12	31	9	12	7	3	4	1	3
1893.	Males	28	121	100	7	5	11	24	23	13	7	2	2	5
	Females	23	101	100	13	17	27	11	14	6	3	3	1	6
1894.	Males	26	113	100	15	11	8	20	13	11	9	5	3	5
	Females	27	97	100	11	9	22	9	14	8	6	7	0	14
1892-94.	Per cent the deaths in each age-group were of all the deaths	------	616	100	11	10	18	17	17	9	6	5	2	7

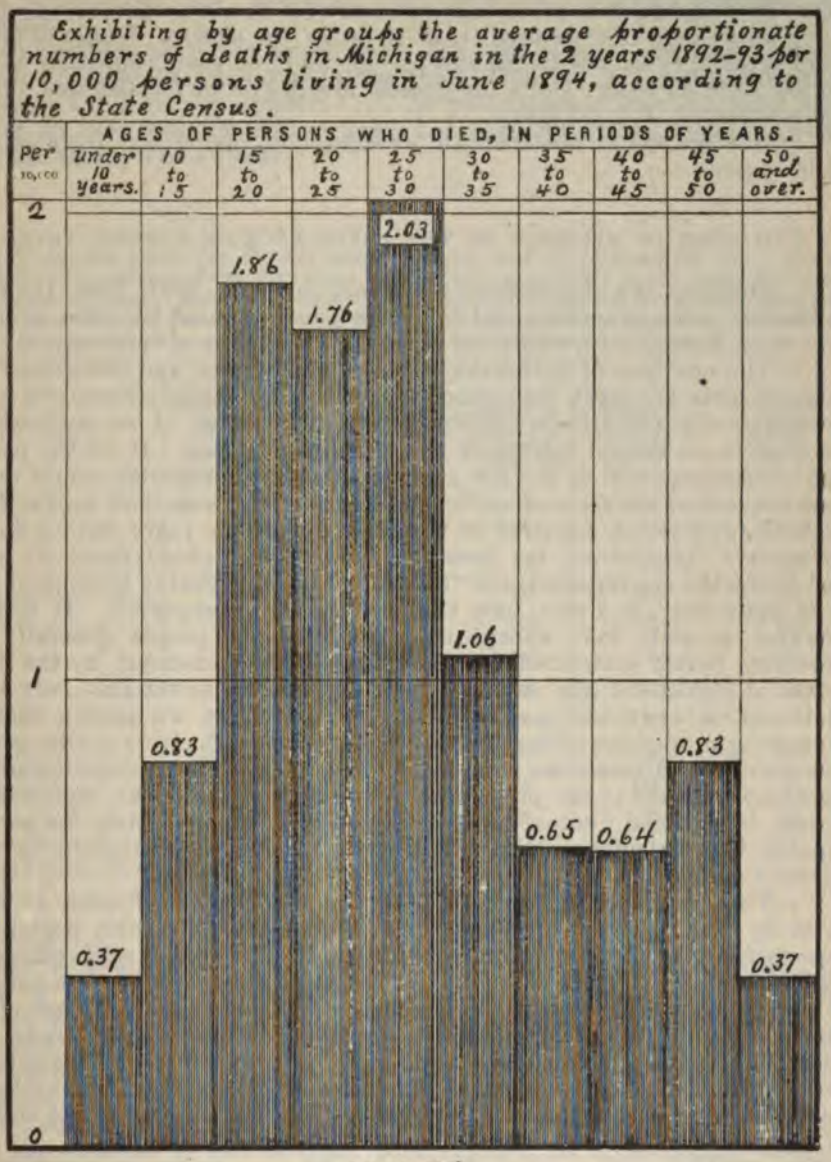
* In each age-group the first year is included but not the last.

TABLE 14.—*Exhibiting by sex, the* **number** *of persons in certain Age-groups who died of Typhoid Fever during each of the three years, 1892-4; also by Age-groups, the average number of deaths in the three years, 1892-4, per 10,000 persons living, in June, 1894, according to the State Census.*

Year.	Sex.	Average age of decedents. Years.	No. of Deaths included.	Number of Deaths in Certain Age-groups.*									
				Under 10 Years.	10 to 15.	15 to 20.	20 to 25.	25 to 30.	30 to 35.	35 to 40.	40 to 45.	45 to 50.	51 Years and over.
1892.	Males	28	116	4	7	21	26	15	9	5	6	4	9
	Females	21	68	12	8	21	6	8	5	2	3	1	2
1893.	Males	28	121	8	6	13	29	28	16	9	3	3	6
	Females	23	101	13	17	27	11	14	6	3	3	1	6
1894.	Males	26	113	17	12	9	23	15	12	10	6	3	6
	Females	27	97	11	9	21	9	13	8	6	7	0	13
1892-94.	Males	Deaths per 10,000 inhabitants, of the same sex, and age, in each age-group.		1.11	2.15	3.88	7.44	7.05	4.12	2.93	2.21	2.0	1.21
	Females			1.42	3.0	6 25	2.51	3.86	2 37	1.57	2.20	.40	1.39
1892-94.	The average number of deaths (both sexes) per 10,000 inhabitants in each age-group for the three years, 1892-94			.42	.86	1.69	1.66	1.83	1.10	.76	.74	.37	.43

* In each age-group the first year is included, but not the last.

AGE-DISTRIBUTION OF DECEDENTS FROM TYPHOID FEVER.



[PLATE 787.]

In studying Tables 12 and 13, and first four lines in Table 14, relative to age of persons who died with or who had typhoid fever, it should be held in mind that there are more persons living in the earlier ages than at the more advanced ages. In the last three lines of Table 14, and in the diagram "Age, distribution," etc., Plate 787, this fact is taken account

of, and the diagram graphically exhibits the relative danger of death at each period of life, according to the experience in Michigan in the two years 1892–3, and it is practically the same for the three years 1892–4.

By Table 14 it may be seen, that to males the greater danger of death from typhoid fever was in the age-periods 20 to 30 years, especially in the period 25 to 30 years; while the greatest death-rate of females was during the age-period 15 to 20 years.

The average age at death of all persons, both males and females, was 25.50 years.

TWO LINES OF EVIDENCE OF THE PREVALENCE OF TYPHOID FEVER.

In studying the prevalence of typhoid fever in 1894, from the facts presented in the preceding and following pages, it must be borne in mind that those facts are derived from two distinct sources of information:

1.—The numbers of outbreaks, of cases of sickness, and of deaths from typhoid fever are taken from special reports from health officers and other township, city and village officers, during the course of an outbreak, at its close or in annual reports at the close of the year. If all the people and officers reported as the law provides, the facts presented would represent the *actual numbers* of outbreaks, cases of sickness, and deaths from typhoid fever which occurred in the State during the year; but *all* do not so report. In Detroit, for instance, relative to typhoid fever, 85 cases and 68 deaths are reported, and the ratio of cases to deaths is so great that it is plain that, as a rule, only the fatal cases were reported. It is just, however, to state that, except in Detroit, as the people generally are becoming better instructed in the measures recommended by the State Board of Health for the saving of life and health, better and more complete reports are made year by year So, each year, we believe that an increasing proportion of the cases of sickness and deaths from the dangerous communicable diseases are reported to this office. This tends toward an apparent increase in the prevalence of the disease each year, modified, of course, by the real fluctuation in prevalence. While waiting for perfect reports, the facts derived from those now received are valuable for purposes of study.

2.—The prevalence of typhoid fever, or of any given disease, as indicated by the "per cent of reports" is taken from the weekly postal-card reports from regular correspondents of the State Board, health officers of cities and villages, and others. The "per cent of reports" is the per cent of the whole number of reports received which stated the presence of the disease named; it gives the relative prevalence of the disease, under the observation of the physicians who report. It may represent the relative area of prevalence of the disease, combined with the relative number of weeks the disease continued where it did occur, *but not the actual number of cases.*

The weekly card-reports, however, furnish a valuable means of ascertaining, approximately, the relative prevalence of the several diseases in a given year, and the relative prevalence of a given disease in one year compared with other years, and it is as good a scheme for ascertaining the facts as is yet available. Therefore the sickness statistics based upon those weekly card-reports should be relied upon for a comparison of the

relative prevalence of typhoid fever in 1894, compared with preceding years. However, the evidence from the two sources may well be compared.

A comparison of the evidence from the two sources, just mentioned, relative to typhoid fever during the years 1885–94, is facilitated by the following Table 15. It appears that the prevalence of typhoid fever was greater in 1894 than in 1892 or 1893, but that the deaths reported were less than in any recent year.

TABLE 15.—*By years for the ten years 1885–94, and an average for the 8 years, 1886–93, the per cent of reports (from regular correspondents to the State Board of Health, and others) stating the presence of Typhoid Fever in Michigan; also, for the same years and period of years, the number of outbreaks, number of localities of outbreaks, the cases of sickness and the deaths reported from Typhoid Fever.*

Years.	Per cent of weekly postal reports stating the presence of typhoid fever.	Reported outbreaks of typhoid fever.	Reported localities of outbreaks of typhoid fever.	Reported cases of sickness from typhoid fever.	Reported deaths from typhoid fever.
1885	8	218	200	715	194
1886	8	290	282	1,194	282
1887	10	335	320	2,424	411
1888	10	316	296	1,511	310
1889	10	432	398	2,530	402
1890	8	330	310	1,924	304
1891	11	543	501	4,670	697
1892	9	527	484	2,591	538
1893	9	545	504	3,512	594
1894	11	600	530	2,805	506
Average 8 Years, 1886-93.	9	415	387	2,545	442

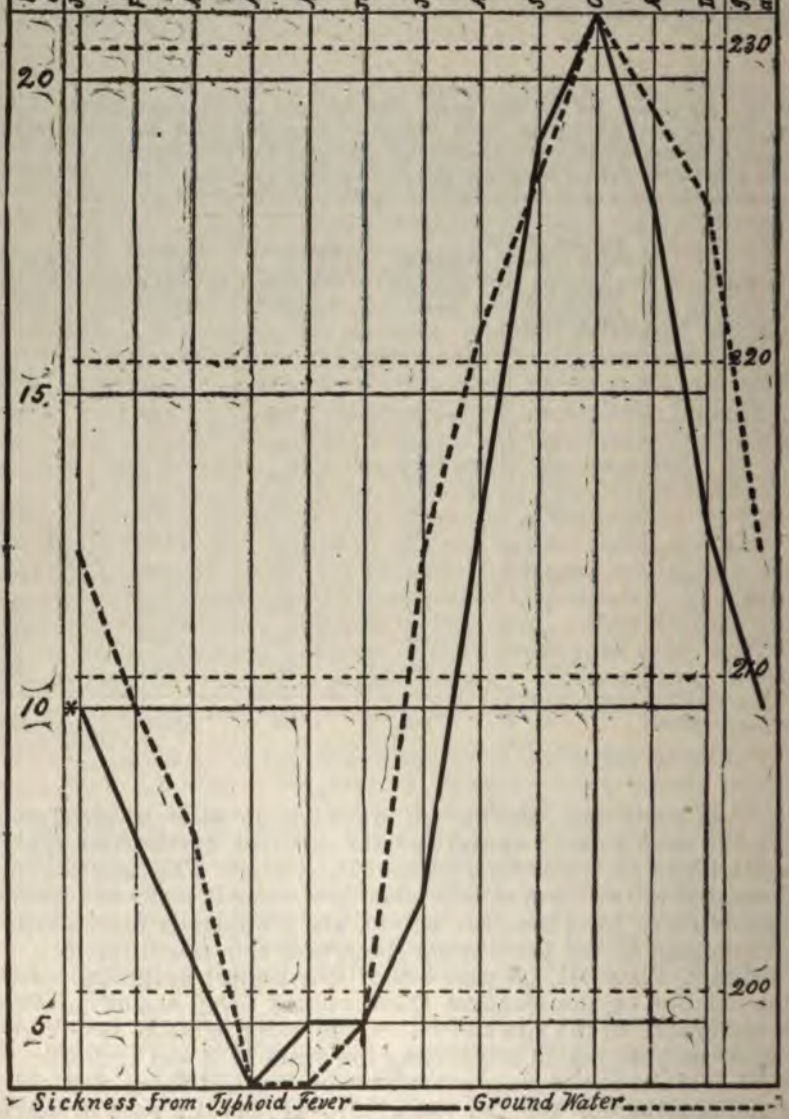
Table 16 exhibits the relation of low water in wells to sickness (as shown by the weekly card-reports) and the reported deaths from typhoid fever in Michigan, for the sixteen years, 1878, 1880-94. The facts similar to those presented in two lines of this table, low water in wells and sickness from typhoid fever, for a ten-year period, are graphically represented in a diagram on page 256 of the Annual Reports of this Board for 1889.

The diagram, Plate 681, on page 322 of this Report graphically represents the relation of the sickness from typhoid fever, according to the sickness statistics, to the rise and fall of the water in wells, in Michigan for the fourteen-year period comprising the years 1878 and 1880–92.

Table 19 exhibits the average prevalence of typhoid fever in Michigan by year and months for the ten years, 1878–87, and for each of the ten years, 1885–94, as indicated by the weekly card-reports made by regular observers. Table 20 exhibits the rainfall by months and years for the period of ten years, 1878–87, and for each of the nine years, 1885–94.

Low Water in Wells, and Sickness from Typhoid Fever in Michigan.

By months, for a period of 14 years, 1878 and 1880-92, the relation of Sickness from Typhoid Fever to the rise and fall of water in wells, in Michigan. (The depth of the water in wells, and the depth of earth above the water was reported by observers at from 1 to 8 stations.)



Sickness from Typhoid Fever _____. Ground Water - - - - - - -

* Indicating what per cent of all reports received stated the presence of Typhoid Fever then under the observation of the physicians reporting.

The danger from typhoid fever is greatest in October, when the water in wells is lowest, and least in April, when the water in wells is highest.

[PLATE 681.]

16.—*Exhibiting, for Michigan, by Months, during the sixteen years, 1878, 4,* the relation of low water in wells to sickness from Typhoid Fever; also, ported number of deaths from Typhoid Fever.*

onditions.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
s of ground above r in wells†	231	224	220	209	208	215	228	234	239	243	241	238
ion from Maximum f water in wells‡	23	16	12	1		7	20	26	31	35	33	30
from Typhoid	12	10	7	6	6	7	10	18	26	28	24	14
ber of reported from Typhoid	27	22	25	27	24	24	29	59	92	104	78	55

ta relating to the sickness and the deaths from typhoid fever in the years 1878, 1880-94, were ler to coincide with the same period for which the measurements of ground above the water in already obtained.

ar 1879 could not be included as, for that year, there was no station from which reports were r the whole year. The stations used in the compilation of this line, and the years for which re received and compiled from each are as follows: Elsie, 1878; Thornville, 1880-1 and 1885-7; 1880, 1884, 1887-90, 1892-94; Mendon and Union City, 1880; Linden and Dearborn, 1881; Brockway 2 and 1883; Otisville and Woodland, 1882; Saginaw City, 1883; Kalamazoo, 1884, 1888, and 1889; . B. of H., 1885-94; Ann Arbor, 1886-94; Alpena, 1887-88; Otsego, 1887; Traverse City, 1888-93; ek, 1888, 1893-94; River Raisin, 1886-91, 1893-94.

. "Max. Depth" was in May, because in that month the "Av. inches of earth above the water," n that month.

t of weekly reports, from observers in different parts of the State, which stated the presence l fever.

a used in the compilation of this line were taken from the Registration Reports of Michigan, tistics. No correction has been made for unequal lengths of months.

17.—HEIGHT OF GROUND WATER.—*Inches of Earth above the Water—by s for the ten years, 1885-94, and for the last four months of the year 1884, and ch of the ten years, 1885-94; also averages for the eight years, 1886-93, at ng, Mich.,—Well in the Capitol Grounds.*

of time.	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
.....	295	297	297	296	292	291	289	291	293	295	298	299	300
.....										290	291	293	292
.....	284	288	289	292	280	281	279	282	283	282	285	281	280
.....	281	276	278	274	272	273	277	282	287	287	286	291	294
.....	290	296	287	280	282	285	288	290	291	291	294	297	294
.....	294	292	298	294	293	293	293	293	290	293	297	294	300
.....	304	298	304	304	302	304	299	299	302	305	308	311	312
.....	300	309	307	305	302	296	292	293	295	300	300	298	300
.....	301	302	305	301	295	294	296	297	300	300	304	306	306
.....	301	308	307	306	305	300	295	293	293	296	300	304	305
.....	295	309	305	304	289	291	284	285	288	293	296	299	292
.....	298	294	293	296	296	294	287	292	296	300	305	313	312
, 1886-93	296	299	299	296	293	292	290	292	293	296	298	300	300

A study of this subject was made by the Secretary of this Board in a paper read before the American Public Health Association, at St. Louis, Mo., Oct. 16, 1884, which was printed in the Annual Report of this Board for the year 1884, pp. 89–114, and the study was continued subsequently, in the Annual Reports of this Board for the years 1888, pp. lv-lvii; 1889, pp. 254–262; 1890, pp. 247–251.

The evidence is conclusive that there is a necessary relation between the low water in wells and the sickness from typhoid fever.

The fluctuations in the sickness from typhoid fever and the depth of the water in wells are nearly coincident throughout the several months. The maximum of sickness and the minimum of water are coincident in October.

The stations at which the measurements of water in wells are taken and the number of years which are available from each station are stated in the dagger (†) foot note of Table 16, page 323. This office has been unable thus far to get accurate measurements of the height of the water in wells for a long period of years from many stations in Michigan. This absence of extensive data is especially deplored when a comparison of one year with a series of years is desired, but in the averages for a series of years by *months*, the evidence is accurate and valuable.

It is believed that all the wells from which measurements of water are made for this office, except the well at Lansing, are in regular daily use, as supplies of water. The well at Lansing is not so used; it is in the capitol grounds, far enough from other wells so as not to be liable to be affected by the rise and fall of the water in other wells from daily use, and so would more nearly represent the gradual rise and fall of the *ground water* than would measurements in wells from which water is drawn. But it has been found, by long continued observations and investigations of the Michigan sickness statistics, contagious-disease statistics, and the reports relative to water in wells, that the rise and fall of the typhoid fever is in much closer relation to the fall and rise of the water in wells in actual use than to the fluctuations in the well at Lansing.

If it ever comes to pass that typhoid-infected wells in Michigan shall be done away with, and what typhoid fever shall then occur shall be only what is contracted in some other way than by the water supply, then it may reasonably be expected that the relation now apparent between low water in wells and typhoid fever will cease. In fact it is claimed that just this has already occurred in Munich, Bavaria. Therefore it seems quite important that a close watch be kept upon the subject, so that as soon as this relation ceases the other sources of typhoid fever may be searched for, with a view to their removal.

From Table 22 it may be seen that the relation of sickness from typhoid fever to the ground water, as represented by the depth of water in the *unused* well at Lansing, is not so close as that which exists between sickness from typhoid fever and low water in wells *in use*, which is shown in Table 18 of this Report. It is still possible, however, that if we could obtain measurements of water in *unused* wells in the different localities whence the reports of typhoid fever are derived, or could we have a full and correct report of all cases of the disease which occurred in Lansing during the same period for which we have measurements of the well there, and before there was a general water supply in Lansing, comparison of those data might show the existence of as close affinity between low *ground water* and typhoid fever, as exists between typhoid and *low water in wells*.

TABLE 18.—*Exhibiting the number of Inches of Earth above the ground water in Lansing, by months, for each of the nine years 1886-94, compared with the per cent of reported cases and outbreaks of Typhoid Fever in Michigan, for each month; also the total numbers of cases and outbreaks reported for those years. (Compiled from those cases of which the date of occurrence was given; and from those outbreaks of which the time of beginning was stated.)*

Specifications relative to Ground Water and Typhoid Fever.	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	No. of cases and outbreaks included in this table.
Inches of earth above the water, year 1886		276	278	274	272	273	277	282	287	287	286	291	294	
Per cent of outbreaks which began in each month, 1886	100	6	4	4	2	2	4	11	15	26	11	11	5	253
Inches of earth above the water, year 1887		296	287	280	282	285	288	290	291	291	294	297	294	
Per cent of cases of typhoid fever reported, year 1887	100	2	1	1	1	2	3	8	20	24	19	12	7	1,096
Per cent of outbreaks which began in each month, 1887	100	5	2	2	3	6	4	12	23	20	11	9	3	289
Inches of earth above the water, year 1888		292	298	294	293	293	293	293	290	293	297	294	300	
Per cent of cases of typhoid fever reported, year 1888	100	5	3	2	3	3	4	7	13	18	23	11	9	609
Per cent of outbreaks which began in each month, 1888	100	7	5	3	3	4	6	12	15	16	15	6	7	265
Inches of earth above the water, year 1889		298	304	304	302	304	299	299	302	305	308	311	312	
Per cent of cases of typhoid fever reported, year 1889	100	1	2	1	2	1	2	4	12	28	24	15	7	1,248
Per cent of outbreaks which began in each month, 1889	100	4	2	3	2	2	5	8	17	21	19	11	6	382
Inches of earth above the water, year 1890		309	307	305	302	296	292	293	295	300	300	298	300	
Per cent of cases of typhoid fever reported, year 1890	100	5	2	2	3	2	2	7	28	18	17	12	6	1,089
Per cent of outbreaks which began in each month, 1890	100	5	4	3	3	6	5	9	25	13	15	6	5	253
Inches of earth above the water, year 1891		302	305	301	295	294	296	297	300	300	304	306	306	
Per cent of cases of typhoid fever reported, year 1891	100	6	2	1	2	2	2	5	14	24	23	13	6	1,464
Per cent of outbreaks which began in each month, 1891	100	6	3	2	3	4	5	8	20	18	19	9	4	454
Inches of earth above the water, year 1892		308	307	306	305	300	295	293	293	296	300	304	305	
Per cent of cases of typhoid fever reported, year 1892	100	5	4	5	5	3	4	5	8	17	22	13	9	2,482
Per cent of outbreaks which began in each month, 1892	100	10	8	3	3	4	5	8	16	16	15	7	9	462
Inches of earth above the water, year 1893		309	305	304	298	291	284	285	288	293	296	299	292	
Per cent of cases of typhoid fever reported, year 1893	100	2	2	3	2	5	13	8	15	18	15	10	6	2,237
Per cent of outbreaks which began in each month, 1893	100	8	3	3	3	3	8	7	16	20	15	8	5	469
Inches of earth above the water, year 1894		294	293	296	296	294	287	292	296	300	305	313	312	
Per cent of cases of typhoid fever reported, year 1894	100	4	3	2	2	2	3	4	9	20	24	18	8	3,282
Per cent of outbreaks which began in each month, 1894	100	7	3	2	5	4	6	8	19	17	17	9	4	527

TABLE 19.—TYPHOID FEVER IN MICHIGAN.—*Average per cent of weekly card-reports stating the presence of Typhoid Fever, by year and Months for the Ten years, 1878-87, and in each of the ten years, 1885-94; also, the average for the eight years, 1886-93.*

Period of time.	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 10 yrs., 1878-87*.	12	10	9	7	5	5	5	7	14	20	22	20	14
1885	† 8	11	7	5	4	3	5	5	6	11	13	16	8
1886	† 8	6	3	4	3	5	4	5	13	16	16	13	10
1887*	10	6	10	4	3	3	4	8	14	22	18	15	11
1888	10	10	7	6	5	4	5	7	12	18	16	12	10
1889	10	8	5	3	3	4	5	5	12	19	25	19	13
1890	8	6	1	2	2	2	5	6	15	15	16	13	7
1891	11	5	5	2	2	3	3	6	12	21	27	21	15
1892	9	7	5	4	4	3	4	5	13	16	17	11	12
1893	9	6	4	3	3	4	6	7	12	16	23	20	8
1894	11	7	5	4	2	6	5	7	15	23	24	17	13
Av. 8 yrs., 1886-93	9	7	5	4	3	4	5	6	13	18	20	16	11

* The figures in the line for 1887, and in the line for the average for the ten years, 1878-87, in this table do not all exactly agree with those in the same lines in the table printed on page lvi, of the report of this Board for the year 1888, for the reason that the table printed in the Report for 1888 was made before the cards were all compiled for the *year*, and was taken from the compilation (of the card reports first received) for the quarterly reports. The line "Average 10 years 1878-87," included the data for the year 1887 and consequently is not exactly, although it is substantially, the same as in the above table.

† Since May, 1885, physicians have reported only the prevalence of diseases under their *own observation*. Previous to that time diseases which were *believed* to be present (under the care of other physicians) were so reported. This undoubtedly accounts for a part of the sudden decrease in 1885 and 1886 as compared with the preceding years.

TABLE 20.—RAINFALL IN MICHIGAN.—*Average number of Inches, by Months, for the ten years, 1878-87, and in each of the ten years, 1885-94; also averages for the eight years, 1886-93.*

Period of time.	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. ten yrs., 1878-87.	37.27	2.09	2.89	2.28	2.49	3.12	4.24	3.44	3.21	3.72	3.45	2.98	2.69
1885	35.82	2.70	.73	.58	2.47	2.30	6.01	2.52	5.82	3.75	3.08	2.90	2.14
1886	32.16	3.05	1.72	2.74	2.40	2.58	2.29	1.36	4.21	5.36	1.97	2 35	2.13
1887	29.82	2.27	4.47	1.18	1.54	2.25	2.76	2.46	1.98	2.84	2.48	2.10	2.55
1888	29.55	1.99	1.77	2.51	2.15	3.73	2.87	2.02	2.38	2.66	2.68	2.92	1.89
1889	28.18	2.42	2.04	1.01	1.62	4.21	3.82	3.07	.98	1.85	1.10	3.10	2.96
1890	30.20	3.53	2.40	2.12	3.37	4.80	3.74	1.47	3.62	2.09	4.97	2.43	1.70
1891	34.66	1.91	3.13	2.74	2.03	1.33	2.53	2.55	4.41	1.92	1.71	4.86	2.54
1892	33.08	1.95	2.16	1.39	2.16	5.45	5.17	2.39	2.92	3.01	1.40	3.14	1.95
1893	36.34	2.34	2.78	2.40	4.77	2.91	3.55	2.83	1.22	2.52	4.24	3.05	3.74
1894	28.74	1.77	1.66	2.09	2.46	6.52	2.76	1.30	.72	3.13	2.76	2.02	1.55
Av. 8 yrs., 1886-93	31.37	2.43	2.56	2.01	2.51	3.41	3.34	2.27	2.72	2.78	2.57	2.99	2.43

TABLE 21.—TEMPERATURE OF THE WATER *in the Well at the State Capitol in* Lansing, *Mich., by Months for the ten years, 1885–94, and the last four months of of the year 1884; also averages for the eight years, 1886–93.*

Year and period of years.	Year.	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1884										50	51	51	49
1885	47	49	47	43	42	46	48	47	45	50	50	51	45
1886	48	49	47	46	45	46	46	47	50	52	52	51	50
1887	48	50	41	42	46	47	48	49	51	50	51	52	51
1888	49	50	49	48	47	48	48	47	50	51	51	52	51
1889	50	50	49	49	48	49	49	50	50	50	51	51	51
1890	50	50	49	49	48	49	49	49	50	51	51	52	51
1891	50	50	49	49	48	49	49	49	50	51	51	51	51
1892	50	50	50	49	49	49	50	49	50	51	53	52	52
1893	50	50	48	47	48	48	49	49	50	51	52	52	51
1894	51	51	50	49	49	49	49	50	50	52	52	53	52
Av. 8 yrs., 1886–93	49	50	48	47	47	48	49	49	50	51	52	52	51

TABLE 22.—*Sickness from Typhoid Fever in Michigan (as indicated by the weekly card-reports by all observers) and the depth of earth (in inches) above the water in the well, and the temperature of the water in the well at* Lansing, *Michigan, averages by Year and Months for the eight years, 1886–93.*

	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Sickness from Typhoid Fever*	9	7	5	4	3	4	5	6	13	18	20	16	11
Inches of earth above water in well†	296	299	299	296	293	292	290	292	293	296	298	300	300
Temperature of water in well‡	49	50	48	47	47	48	49	49	50	51	52	52	51

* Per cent of all reports received (from observers in different parts of the State) which stated the presence of typhoid fever from last line in Table 19.
† This line is copied from the last line in Table 17.
‡ This line is copied from the last line in Table 21.

EXHIBIT III.—*Showing number of inches of ground above the water, and inches of water in the Observation well at Lansing, by months and annual average for each of the nine years, 1886–94. (The depth of the well remained stationary at 324 inches through the whole period.)*

1886.			1887.			1888.			1889.			1890.		
Month.	Inches of ground above water in well.	Inches of water in well.	Month.	Inches of ground above water in well.	Inches of water in well.	Month.	Inches of ground above water in well.	Inches of water in well.	Month.	Inches of ground above water in well.	Inches of water in well.	Month.	Inches of ground above water in well.	Inches of water in well.
Jan.	276	48	Jan.	296	28	Jan.	292	32	Jan.	298	26	Jan.	309	15
Feb.	278	46	Feb.	287	37	Feb.	298	26	Feb.	304	20	Feb.	307	17
Mar.	274	50	Mar.	280	44	Mar.	294	30	Mar.	304	20	Mar.	305	19
Apr.	272	52	Apr.	282	42	Apr.	293	31	Apr.	302	22	Apr.	302	22
May	273	51	May	285	39	May	293	31	May	304	20	May	296	28
June	277	47	June	288	36	June	293	31	June	299	25	June	293	32
July	282	42	July	290	34	July	293	31	July	299	25	July	293	31
Aug.	287	37	Aug.	291	33	Aug.	290	34	Aug.	302	22	Aug.	295	29
Sept.	287	37	Sept.	291	33	Sept.	293	31	Sept.	305	19	Sept.	300	24
Oct.	286	38	Oct.	294	30	Oct.	297	27	Oct.	308	16	Oct.	300	24
Nov.	291	34	Nov.	297	27	Nov.	294	30	Nov.	311	13	Nov.	298	26
Dec.	294	30	Dec.	294	30	Dec.	300	24	Dec.	312	13	Dec.	300	24
Total	3,377	512	Total	3,475	413	Total	3,530	358	Total	3,648	240	Total	3,597	291
Av. by year.	281	43	Av. by year.	290	34	Av. by year.	294	30	Av. by year.	304	20	Av. by year.	300	24

1891.			1892.			1893.			1894.		
Jan.	302	22	Jan.	308	16	Jan.	309	15	Jan.	294	30
Feb.	305	19	Feb.	307	17	Feb.	305	19	Feb.	293	31
Mar.	301	23	Mar.	306	18	Mar.	304	20	Mar.	296	28
Apr.	295	29	Apr.	305	19	Apr.	298	26	Apr.	296	28
May	294	30	May	300	24	May	291	33	May	294	30
June	296	28	June	295	29	June	284	40	June	287	37
July	297	27	July	293	31	July	285	39	July	293	32
Aug.	300	24	Aug.	293	31	Aug.	288	36	Aug.	296	28
Sept.	300	24	Sept.	296	28	Sept.	293	31	Sept.	300	24
Oct.	304	20	Oct.	300	24	Oct.	296	28	Oct.	305	19
Nov.	306	18	Nov.	304	20	Nov.	299	25	Nov.	313	11
Dec.	306	18	Dec.	305	19	Dec.	292	32	Dec.	312	12
Total	3,606	282	Total	3,607	276	Total	3,544	344	Total	3,578	310
Av. by year.	301	24	Av. by year.	301	23	Av. by year.	295	29	Av. by year.	298	26

TABLE 23.—*Exhibiting the Average Total Annual Rainfall at Stations in Michigan, the same for Lansing, the inches of earth above the ground water at* Lansing, *the inches of water in an undisturbed well at Lansing, and the reported sickness, from Typhoid Fever in Michigan, as indicated by the per cent of all the weekly card-reports which stated the presence of Typhoid Fever, during each of the 10 years, 1885-94, and averages for the 8 years, 1886-93.*

Year, and period of years.	Average total Annual Rainfall at Stations in Michigan, in inches.	Total Annual Rainfall at Lansing in inches.	* Inches of earth above the Ground Water at Lansing.	* Inches of water in an unused well at Lansing.	Ground Water higher (+) or lower (—) than the eight years' Average in inches.	Average Per Cent of all weekly card-reports stating the presence of Typhoid Fever.	More (+) or less (—) Sickness From Typhoid Fever than the eight years' Average.
1885	35.82	34.51	284	40	+12	8	—1
1886	32.16	29.52	281	43	+15	8	—1
1887	29.82	30.08	290	34	+6	10	+1
1888	29.55	25.76	294	30	+2	10	+1
1889	28.18	23.28	304	20	—8	10	+1
1890	30.20	33.96	300	24	—4	8	—1
1891	31.66	29.05	301	24	—4	11	+2
1892	33.08	31.97	301	23	—5	9	=
1893	36.34	39.52	295	29	+1	9	=
1894	28.74	24.96	298	26	—2	11	+2
Av. 8 yrs., 1886-93	31.37	30.39	296	28		9	

* Taken from Exhibit III.

Exhibit III, practically, as it appears above, has been in use since 1885, but it is now published for the first time for the purpose of explanation and for reference.

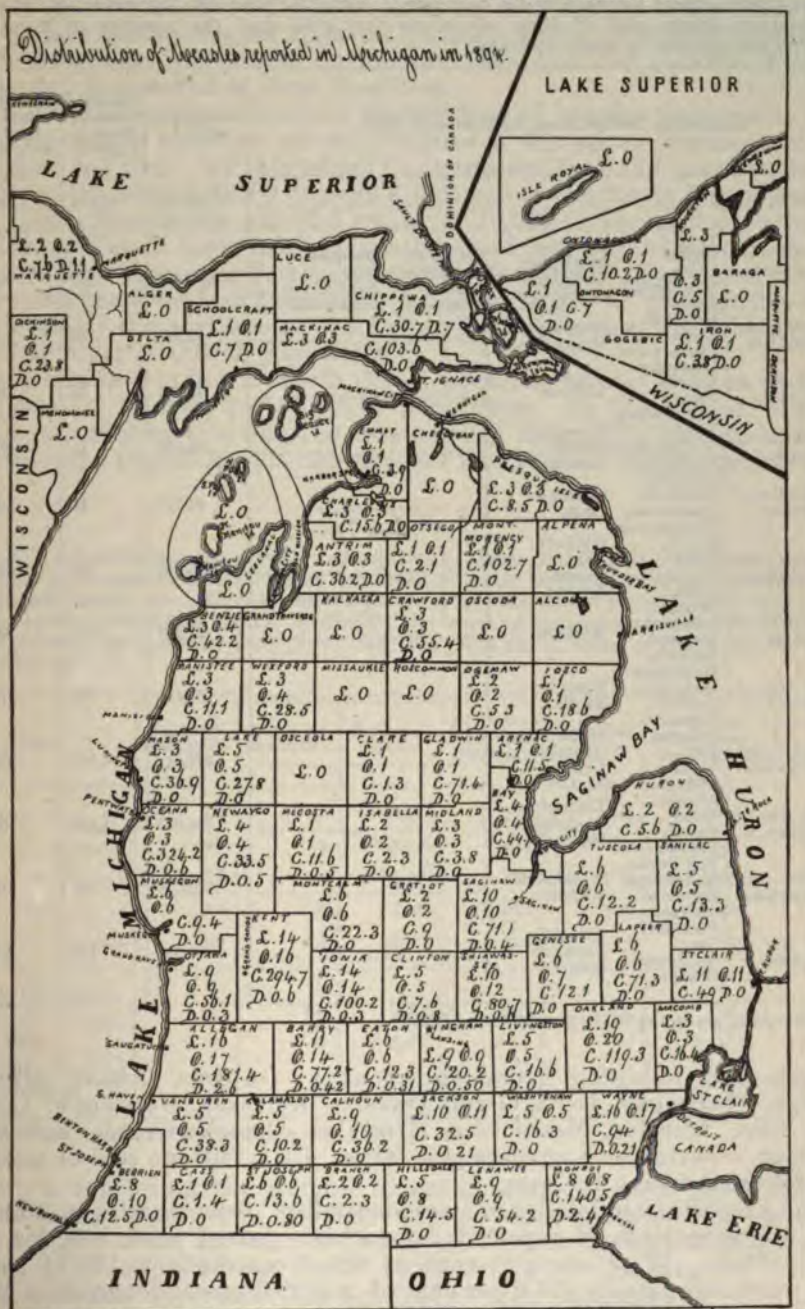
The third and fourth columns of Table 23, "Inches of earth above the ground water at Lansing," and "Inches of water in an unused well at Lansing," are copied directly from the Annual averages found in the above exhibit, in which the inches of ground water in the well, by months, (taken from the monthly observations by the observer at this office, pp. 16 and 17 of this Report) are deducted from the depth of the well, which, through the whole period has remained the same (323½ inches) and which for purposes of comparison in relation to typhoid fever, and for convenience in computation has been figured as 324 inches.

TABLE 1.—*Numbers of Cases and Deaths reported from Measles per 10,000 persons living in each county in Michigan during the year 1894. (Compiled from reports of health officers, clerks, etc.*

Counties.	* Population of Michigan for 1894.	Number of reported		Number, per 10,000 population, of		Counties.	* Population of Michigan for 1894.	Number of reported		Number, per 10,000 population, of	
		Cases.	Deaths.	Cases.	Deaths.			Cases.	Deaths.	Cases.	Deaths.
State	2,241,454	10,518	55	46.88	.25	Keweenaw	2,804	0	0	0	0
						Lake	5,895	164	0	27.82	0
Alcona	5,411	0	0	0	0	Lapeer	28,874	206	0	71.34	0
Alger	1,384	0	0	0	0	Leelanaw	9,395	0	0	0	0
Allegan	39,185	711	10	181.44	2.55	Lenawee	48,541	263	0	54.18	0
Alpena	17,715	0	0	0	0	Livingston	20,435	34	0	16.64	0
Antrim	13,427	45	0	36.21	0	Luce	2,348	0	0	0	0
Arenac	6,941	8	0	11.53	0	Mackinac	7,237	75	0	103.63	0
Baraga	4,232	0	0	0	0	Macomb	32,382	53	0	16.37	0
Barry	23,699	183	1	77.22	.42	Manistee	26,112	29	0	11.11	0
Bay	61,292	27	0	44.05	0	Manitou	917	0	0	0	0
Benzie	8,060	34	0	42.18	0	Marquette	38,004	29	4	7.63	1.05
Berrien	45,628	57	0	12.49	0	Mason	18,418	68	0	36.92	0
Branch	26,204	6	0	2.29	0	Mecosta	20,730	24	1	11.58	.48
Calhoun	47,471	172	0	36.23	0	Menominee	23,736	0	0	0	0
Cass	21,176	3	0	1.42	0	Midland	13,223	5	0	3.78	0
Charlevoix	10,931	17	0	15.55	0	Missaukee	6,956	0	0	0	0
Cheboygan	13,596	0	0	0	0	Monroe	33,179	466	8	140.45	2.41
Chippewa	15,319	47	1	30.68	.65	Montcalm	34,155	76	0	22.25	0
Clare	7,975	1	0	1.25	0	Montmorency	2,435	25	0	102.67	0
Clinton	26,262	20	2	7.62	.76	Muskegon	37,323	35	0	9.38	0
Crawford	2,710	15	0	55.35	0	Newaygo	19,124	64	1	33.47	.52
Delta	19,259	0	0	0	0	Oakland	42,668	509	0	119.29	0
Dickinson	14,699	35	0	23.81	0	Oceana	18,597	538	1	324.15	.60
Eaton	32,612	40	1	12.27	.31	Ogemaw	5,636	3	0	5.32	0
Emmet	10,381	4	0	3.85	0	Ontonagon	6,873	7	0	10.18	0
Genesee	40,553	49	0	12.08	0	Osceola	16,475	0	0	0	0
Gladwin	4,900	35	0	71.43	0	Oscoda	1,804	0	0	0	0
Gogebic	14,083	1	0	.71	0	Otsego	4,794	1	0	2.09	0
Gd. Traverse	17,514	0	0	0	0	Ottawa	39,075	219	1	56.05	.26
Gratiot	28,770	26	0	9.04	0	Presque Isle	5,910	5	0	8.46	0
Hillsdale	30,271	44	0	14.53	0	Roscommon	1,657	0	0	0	0
Houghton	44,174	22	0	4.98	0	Saginaw	81,841	582	3	71.11	.37
Huron	32,249	18	0	5.58	0	Sanilac	33,994	45	0	13.26	0
Ingham	39,689	80	2	20.16	.50	Schoolcraft	7,127	5	0	7.02	.81
Ionia	34,817	349	1	100.24	.29	Shiawassee	32,827	265	2	80.73	.80
Iosco	12,389	23	0	18.64	0	St. Clair	54,315	266	0	48.97	0
Iron	5,293	2	0	3.78	0	St. Joseph	25,087	34	2	13.55	.80
Isabella	21,439	5	0	2.33	0	Tuscola	34,411	42	0	12.21	0
Jackson	46,527	151	1	32.45	.21	Van Buren	31,059	119	0	38.34	0
Kalamazoo	42,055	43	0	10.22	0	Washtenaw	43,491	71	0	16.33	0
Kalkaska	5,637	0	0	0	0	Wayne	292,495	285	6	9.40	.21
Kent	121,919	3,593	7	294.70	.57	Wexford	14,047	40	0	28.48	0

* Population, according to the State Census of 1894.

DISTRIBUTION OF MEASLES IN MICHIGAN IN 1894.
BY COUNTIES, THE REPORTED CASES AND DEATHS PER 10,000 INHABITANTS.



L. = Localities, O. = Outbreaks, C. = Cases per 10,000 population, D. = Deaths per 10,000 population.

[PLATE 145.]

TABLE 2.—*Exhibiting the Population of Michigan for the year 1894, by tiers of counties (Upper Peninsula as one tier); also the number of cases of Measles* REPORTED *from each of these divisions for 1894, and the number of cases per 10,000 population of each division.*

Counties in Groups, most Northern ones First.					Population, 1894.*	Reported Cases of Measles, 1894.	Reported Cases per 10,000 of Population.
State					2,241,454	10,518	46.88
Upper Peninsula	Alger. Delta. Schoolcraft. Luce.	Mackinac. Chippewa. Keweenaw.	Houghton. Ontonagon. Gogebic. Baraga.	Marquette. Iron. Menominee. Dickinson.	206,572	223	10.80
Eleventh tier of counties	Manitou. Emmet. Charlevoix.	Cheboygan. Presque Isle.			42,035	26	6.19
Tenth tier of counties	Leelanaw. Antrim. Otsego. Montmorency.	Alpena.			46,766	71	15.20
Ninth tier of counties	Benzie. G'd Traverse. Kalkaska.	Crawford. Oscoda. Alcona.			41,136	49	11.91
Eighth tier of counties	Manistee. Wexford. Missaukee. Roscommon.	Ogemaw. Iosco.			66,747	95	14.23
Seventh tier of counties	Mason. Lake. Osceola. Clare.	Gladwin. Bay. Huron. Arenac.			154,145	321	20.82
Sixth tier of counties	Oceana. Newaygo. Mecosta. Isabella.	Midland.			91,113	638	69.80
Fifth tier of counties	Muskegon. Montcalm. Gratiot. Saginaw.	Tuscola. Sanilac.			250,444	806	32.18
Fourth tier of counties	Ottawa. Kent. Ionia. Clinton.	Shiawassee. Genesee. Lapeer. St. Clair.			378,642	4,967	131.18
Third tier of counties	Allegan. Barry. Eaton. Ingham.	Livingston. Oakland. Macomb.			230,670	1,610	69.80
Second tier of counties	Van Buren. Kalamazoo. Calhoun. Jackson.	Washtenaw. Wayne.			503,098	841	16.52
First tier of counties	Berrien. Cass. St. Joseph. Branch.	Hillsdale. Lenawee. Monroe.			230,086	873	37.94

* Population, according to the State Census of 1894.

From the following seventeen counties: Alcona, Alger, Alpena, Baraga, Cheboygan, Delta, Grand Traverse, Kalkaska, Keweenaw, Leelanaw, Luce, Manitou, Menominee, Missaukee, Osceola, Oscoda, and Roscommon,—having an aggregate population of 151,140—no case of measles was reported during the year.

The proportionate fatality or "case-mortality" from measles in 1894,—*i. e.*, the proportion of reported cases which proved fatal, was, for the whole State, .52 of one per cent, or about one death to 191.24 cases. The maximum fatality (13.8 per cent of reported cases) occurred in Marquette county. The minimum fatality (.19 of one per cent of reported cases, was the same for both the counties of Oceana and Kent.

From 48 of the 67 counties in which measles was reported to have occurred, no deaths from this disease were reported.

The map which follows Table 1, shows for each county of the State the sickness and death-rates per 10,000 of population, the number of localities where the disease was present during the year, and the number of outbreaks which occurred in those localities.

Table 2 exhibits the latitudinal distribution of measles throughout the State, by tiers of counties; all the counties of the upper peninsula considered as one tier. By this table (2), it appears that the greatest sickness-rate (131.18 per 10,000 of population) was in the fourth tier of counties. The sickness-rate was 69.8 cases per 10,000 of population in both the third and sixth tiers; in all the other tiers of counties the sickness-rates were less than the average sickness-rate for the State. The tier of counties having the lowest sickness-rate (6.19 per 10,000 of population) was the eleventh; the next lowest, the Upper Peninsular tier, with a sickness-rate of 10.8 per 10,000 of population.

The sickness-rate in the fourth tier of counties, as may be seen in the table, was 131.18 cases per 10,000 of population. In the city of Grand Rapids, situated in this tier, the rate was 399.12 per 10,000, and in this tier excluding Grand Rapids, the rate was 99.56 per 10,000 of population.

TABLE 3.—*Exhibiting the numbers of outbreaks, cases and deaths from Measles, the Number of localities in which they occurred, together with the average numbers of cases and deaths per outbreak, and the per cent of cases which proved fatal, reported to the office of the State Board of Health for each of the 5 years, 1890-94; with the departure of the same for 1894, from 1893, and from the average of the same for the 4 years, 1890-93.*

Year.	Reported Outbreaks.	Reported Localities.	Reported Cases.	Av. No. of Cases per Outbreak.	Reported Deaths.	Av. No. of Deaths per Outbreak.	Deaths per 100 Cases.
1890	421	407	*11,911	28.3	140	.33	1.2
1891	394	379	*12,173	30.9	149	.38	1.2
1892	238	229	*3,830	16.1	76	.32	2.0
1893	365	326	*7,334	20.1	119	.33	1.6
1894	359	339	10,518	29.3	55	.15	.5
Average for 4 years, 1890-93	355	335	8,812	23.9	121	.34	1.5
Departure of 1894 from 1893	+6	+13	+3,184	+9.2	−64	−.18	−1.1
Departure of 1894 from the average for 4 years, 1890-93	+4	+4	+1,706	+5.4	−66	−.19	−1.0

* Only the fatal cases were reported from Detroit.

Table 4, exhibiting the number of deaths from measles, per 100,000 persons living, reported to the Secretary of State, probably more accurately represents the annual fluctuations of, but not the total deaths from measles in Michigan during the 27 years, 1868–94. The diagram [Plate 793] graphically represents the same data, with the exception of those for the years 1893–94.

TABLE 4.—*Exhibiting the reported number of deaths from measles per 100,000 persons living in Michigan in each of the 27 years, 1868-94. (Compiled from the Secretary of State's Vital Statistics of Michigan. Population estimated by average annual increase, by Dr. Wilbur, Chief of Vital Statistics in State Department.*)*

Year.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.
Deaths (per 100,000, etc.)	8.66	12.88	4.72	5.45	14.12	18.56	3.37	9.50	8.10	4.13	1.03	10.49	7.63

Year.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.
Deaths (per 100,000, etc.)	15.21	8.68	14.54	7.91	2.04	6.75	14.56	20.62	5.08	10.94	10.51	3.29	5.76	3.75

* Estimate based on the U. S. census of 1890 and State census of 1894. (Computed by arithmetical method,—average annual increase.)

Reported Deaths from Measles in Michigan, 25 Years, 1868-92.

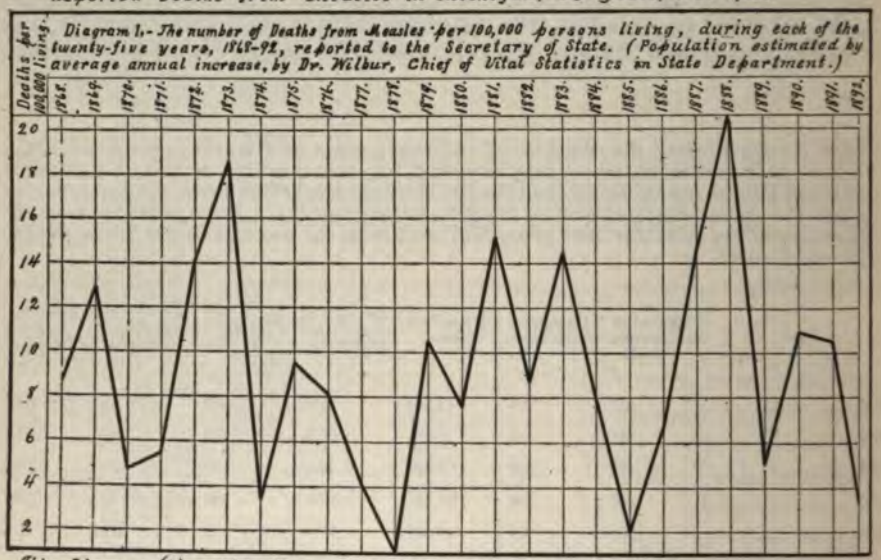


Diagram 1.- The number of Deaths from Measles per 100,000 persons living, during each of the twenty-five years, 1868-92, reported to the Secretary of State. (Population estimated by average annual increase, by Dr. Wilbur, Chief of Vital Statistics in State Department.)

This Diagram (1) graphically represents Table 1 which supplies the figures in detail.

[PLATE 793.]

NUMBER OF OUTBREAKS OF MEASLES IN EACH MONTH OF THE YEAR 1894.

TABLE 5.—*Exhibiting the reported number of outbreaks of Measles which Began, the number which Ended, and the number of outbreaks which were Present, in each Month of the Year 1894, in the different local jurisdictions of Michigan.*

Outbreaks.	Jan.	Feb.	Mar.	Apr.	May	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Number began	19	22	42	71	63	46	9	7	4	5	7	11	306
Number ended	0	10	15	23	45	56	35	15	4	1	7	11	222
Number present	19	38	65	105	134	119	61	29	15	16	20	21	

The last line of figures, in Table 5, representing the reported number of outbreaks present, is not derived from the preceding two lines, as might be supposed, but is obtained by actual count of the number of outbreaks reported as existing in each month. Frequently the beginning of an outbreak is reported but the end of the outbreak is not reported; and sometimes the month in which the outbreak ended is given without giving the date of the beginning of the outbreak. In either case the outbreak may have begun and ended in the same month, or it may have extended through several months. There were 84 more beginnings than endings of outbreaks reported during the year 1894.

TABLE 6.—*Exhibiting the Number and Per Cent of Cases of Measles in Michigan in each Month during the Year 1894. (Includes each case for which, the time during which it existed, was stated in the reports. Each of such cases is counted in each month in which, or part of which, the case was reported to have existed.)*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Number of cases present...	281	698	1,503	1,787	1,419	827	222	91	68	116	87	125
Per cent of cases present...	2.7	6.6	14.3	17.0	13.5	7.9	2.1	0.9	0.7	1.1	0.8	1.2

The first line of figures in Table 6, exhibits the number of cases reported sick in each month or any part of the month.

The last line of figures, in this table, exhibits the per cent the cases sick in each month are of the whole number of cases reported to this office for the year 1894.

SOURCE OF CONTAGIUM OF CASES OF MEASLES.

Of the 10,518 cases of measles reported to this office, as having occurred in the year 1894, the local health officials reported relative to the source of contagium in ways which may be summarized as follows:—Traced to a former case, 1,441; probably traced to a former case, 10; unknown, 2,406; not stated, 6,548; as coming from outside of jurisdiction, 113.

TABLE 7.—*Reported source of Contagium of cases of Measles in Michigan during the year 1894.*

Source.	Numbers of cases.
Traced to a former case	1,441
Probably traced to a former case	10
Unknown (includes reported "epidemic," "exposure," "sporadic")	2,406
Not stated	6,548
Reported as coming from outside of jurisdiction	113
All cases reported in Michigan in 1894	10,518

Cases of Measles Traced to Former Cases.

The following are representative statements taken from health officers' reports in which cases of measles are traced to a previous case of the disease:

"A railroad man came with a little girl from Indiana, who directly exposed the two little ones."—*Cicero M. Stuck, M. D., Plainwell village, Allegan county.*

"Exposure to other persons."—*H. A. Powers, M. D., Assyria township, Barry county.*

"Was exposed by a child in Lake Odessa."—*A. J. Wright, M. D., Carlton township, Barry county.*

"A child visiting in Grand Rapids contracted the disease and infected our school with it before it was known."—*Geo. W. Matteson, M. D., Middleville village, Barry county.*

"The teacher exposed all."—*Joseph E. Daniels, H. O., Clarendon township, Calhoun county.*

"Exposure to one sick with the disease in the township of Chester, Eaton county."—*Chas. S. Snell, M. D., Vermontville village, Eaton county.*

"Patient visited a child in Grand Rapids afflicted with the disease."—*F. B. Meloche, M. D., Belding city, Ionia county.*

"By receiving breath of persons."—*David Gates, H. O., Berlin township, Ionia county.*

"A child belonging to Nelse Olson of Grayling, visited at Lewiston and in the hotel came down with the disease. Children in hotel contracted disease from him."—*Thos. S. Glenn, M. D., Albert township, Montmorency county.*

"From a school-girl from Royal Oak village coming down in our school."—*Jno. L. Campbell, M. D., Birmingham village, Oakland county.*

"Exposure to cases in the township."—*W. A. Mumbrue, M. D., Bloomingdale village, Van Buren county.*

"By exposure to infected child from Detroit."—*J. M. Collier, M. D., Plymouth village, Wayne county.*

MOVEMENTS OF CONTAGIUM OF MEASLES IN MICHIGAN IN 1894.

On the accompanying map, the spread of measles in Michigan as reported to this office in the year 1894, is shown by black lines which connect the localities; the arrow-head indicates the direction of the movement in each case. The source of this information is given in the list of "extracts of reports of health officers" (beginning on page 347) with the name and address of each health officer who traced the source of contagium in his jurisdiction to some outside jurisdiction. Tabular statements relating to these instances are in Table 8. Consecutive numbers in the first column of Table 8, preceding each "First Locality" from which diphtheria spread, refer to corresponding consecutive numbers preceding the paragraphs in the "extracts from reports of health officers," under the sub-head "*Outbreaks of Measles Traced to Other Jurisdictions.*"

On page 344, the ‡ footnote contains a statement of interesting facts concerning the probable source of the measles in Grand Rapids. In that city and in places to which measles was spread from Grand Rapids, nearly four thousand cases of measles with twelve deaths were reported in 1894. The health officer attributes the source as "European immigrants." From page 344 and the map on page 399, it may be seen that Grand Rapids was the source of a large proportion of the outbreaks of measles in Michigan in 1894.

MOVEMENTS OF CONTAGIUM OF MEASLES IN 1894.



[PLATE 846]

TABLE 8.—*First, second and third localities, where the second locality was infected with Measles from the first, and the third was infected from the second, and the numbers of cases and deaths from Measles in the first, second and third localities, with the dates of the beginning and ending of each outbreak. (Compiled from reports of health officers who were able to trace the source of contagium to other localities.)*

Number.†	First Localities from which Measles was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
1	Allegan county: Lee township.....	4	0	Allegan county: Cheshire township... (Mar. 11—.)	235	0	Allegan county: Clyde township..... (Apr. 1-May 11.)	8	2
2	Allegan county: Martin township..... (Jan.-Feb.)	75	2	Allegan county: Plainwell village..... (Jan. 14-Mar.)	5	0			
3	Allegan county: Wayland village.....	*		Berrien county: Buchanan village.... (May 10-Aug. 15.)	9	0			
4	Berrien county: Lake township..... (Apr. 1-June 28.)	30	0	Berrien county: Benton Harbor city.. (May 18-June.)	1	0			
5	Berrien county: St. Joseph city..... (Apr.—.)	1	0	Berrien county: Benton Harbor city.. (May 26—.)	1	0			
6	Branch county: Butler township	*		Calhoun county: Clarendon township. (May-May.)	1	0			
7	Calhoun county: Albion city.....	1	0	Jackson county: Parma township..... (—Apr.)	4	0			
				Parma village..... (June 22-July 27.)	8	0			
				Barry county: Barry township (June 14-Aug. 20.)	3	0	Barry county: Hastings city.....	1	0
				Calhoun county: Burlington township. (May—.)	2	0			
8	Calhoun county: Battle Creek city.....	*		Eaton county: Carmel township..... (Apr. 20-May 7.)	3	0			
				Kalamo township..... (Apr. 24-July 4.)	4	0			
				Kalamazoo county: Pavilion township... (Mar. 1-June.)	22	0			
				Livingston county: Hamburg township.. (May 3-May 13.)	1	0			
9	Calhoun county: Le Roy township..... (Apr. 15—.)	30	0	Branch county: Union City village... (May 23—.)	2	0			
10	Crawford county: Grayling township...			Crawford county: Center Plains Twp... (May—.)	7	0			
				Montmorency county: Albert township (May 5-July 4.)	25	0			

† The consecutive numbers in this column refer to similar consecutive numbers before the quotations in the text following this table.

* Measles was not reported to this Office by the health officer of the "first" locality at the time it was said to have spread from there. This may indicate neglect in the locality from which the disease is reported to have spread.

TABLE 8.—CONTINUED.—*Movement of Infection of Measles.*

Number.†	First Localities from which Measles was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
11	Eaton county: Chester township	*		Eaton county: Vermontville village. (June 10-July 15.)	2	0			
12	Genesee county: Fenton village. (Apr. 8—.)			Oakland county: Milford township. (Apr.-May.)	2	0			
13	Gratiot county: Elba township	*		Clinton county: St. Johns village. (Aug. 10-Aug. 16.)	9	0			
14	Ingham county: Lansing city	31	0	Barry county: Middleville village. (July 30-Aug. 11.)	1	0			
				Ingham county: Lansing township	1	0			
15	Ingham county: Mason city. (—May 5.)	2	0	Ingham county: Aurelius township. (May 8—.)	10	0			
				Vevay township. (May 19-June 1.)	1	0			
16	Ionia county: Lake Odessa village	*		Barry county: Carlton township. (Mar. 25-Apr. 4.)	2	0			
17	Ionia county: Saranac village. (May 11-July 10.)	64	0	Ionia county: Boston township. (May 20-June 23.)	15	0			
18	Jackson county: Jackson city. (Mar. 26-Nov. 10.)	24	1	Hillsdale county: Hillsdale city. (June 5-June 19.)	1	0			
				Jackson county: Spring Arbor twp. (June 10-July 27.)	5	0	Jackson county: Concord village‡	69	0
19	Jackson county			Livingston county: Unadilla township. (Apr. 7-May 18.)	30	0			
20	Jackson county: Norvell township. (June 4-June 30.)	4	0	Jackson county: Columbia township. (July 14—.)	1	0			
21	Kent county			Allegan county: Hopkins township. (Jan.-May.)	80	1	Allegan county: Monterey township. (Mar. 6-Apr. 24.)	17	0
22	Kent county: Vergennes township	*		Kent county: Cannon township. (Apr. 6-Apr. 24.)	5	0			
23	Lake county: Chase township	*		Mecosta county: Big Rapids city. (Mar. 11-July 31.)	24	1			
24	Lapeer county: Dryden township	1	0	Lapeer county: Almont township. (Feb. 1—.)	6	0			
25	Lenawee county: Hudson city	*		Hillsdale county: Hillsdale city. (May-May.)	3	0			

†The consecutive numbers in this column refer to similar consecutive numbers before the quotations in the text following this table. * Measles was not reported to this Office by the health officer of the "first" locality at the time it was said to have spread from there. This may indicate neglect in the locality from which the disease is reported to have spread. ‡ From Concord village to Albion township, Calhoun county, 2 cases, and to Concord township, Jackson county, 21 cases.

TABLE 8.—CONTINUED.—*Movement of Infection of Measles.*

Number.†	First Localities from which Measles was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
26	Livingston county: Fowlerville village	*		Ingham county: White Oak township. (Apr.-May.)	7	1			
27	Macomb county: Romeo village. (Apr. 28-Aug. 8.)	17	0	St. Clair county: Berlin township	1	0			
28	Marquette county: Marquette city (Mar.-Apr. 15.)	6	0	Dickinson county: Iron Mountain (June-Aug.)	35	0			
29	Mason county: Ludington city (Mar. 28-June 28.)	60	0	Ionia county: Orleans township (June 9-June.)	2	0			
				Mason county: Scottville village. (June 1-June 26.)	4	0			
30	Monroe county: Monroe city (Apr. —.)	104	0	Lenawee county: Deerfield township	35	0			
				Deerfield village	20	0			
31	Oakland county: Bloomfield township	*		Oakland county: Troy township (Mar. 9-Mar.)	2	0			
32	Oakland county: Orion township.	*		Oakland county: Addison township (June 17-July 10.)	3	0			
33	Oakland county: Pontiac city (Feb. 13—.)	300	0	Oakland county: Clarkston village (June 10-June.)	4	0			
				Independence Twp. (Apr. 12-July 2.)	32	0			
				Oxford village (Mar. 29—.)	1	0	Lapeer county: Almont village (May 23-June 13.)	3	0
34	Oakland county: Royal Oak village (Jan. —.)	35	0	Oakland county: Birmingham village (Feb. 3-Mar. 19.)	28	0			
35	Oakland county: Southfield township	1	0	Oakland county: Farmington Twp. (Apr. 24-July)	32	0	Wayne county: Livonia township (Apr. 28-May 18.)	55	0
				Farmington village. (Apr. 19-May.)	25	0			
36	Ottawa county: Jamestown township. (Apr. 1—.)	75	0	Ottawa county: Georgetown Twp. (May 16-July 12.)	52	0			
				Bay county: Hampton township	3	0	Bay county: Essexville village (Apr. 23-May 24.)	3	0
				Crawford county: Frederic township (Feb. 23—Apr. 9.)	7	0	Iosco county: Tawas City village (Mar. 26-June.)	23	0
37	Saginaw county: Saginaw city	506	2	Huron county: Brookfield township. (Mar. -June 5.)	12	0			
				Shiawassee county: Rush township (Feb. 4-May 14.)	6	0			
				Wexford county: Cadillac city	1	0			

† The consecutive numbers in this column refer to similar consecutive numbers before the quotations in the text following this table. * Measles was not reported to this Office by the health officer of the "first" locality at the time it was said to have spread from there. This may indicate neglect in the locality from which the disease is reported to have spread.

TABLE 8.—CONTINUED.—*Movement of Infection of Measles.*

t Localities from which Measles was spread.			Second Localities infected from First.			Third Localities infected from Second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
rassee county: igeburg village	*		Shiawassee county: Perry village (Aug.-Sept.)	3	0			
rassee county: aso city b. 7-July 21.)	139	0	Saginaw county: Chesaning township. (Apr.-May. 2.)	10	0	Saginaw county: Swan Creek township (Apr. 20—.)	14	0
			Shiawassee county: Byron village (Sept. 12-Oct.)	2	0			
air county: a township r. 6-Apr. 15.)	1	0	St. Clair county: Yale village (June —.)	7	0			
air county: Huron city ne 1-June.)	12	0	St. Clair county: Memphis village	40	0			
seph county: idas township	10	0	St. Joseph county: Park township	1	0			
Buren county: mbia township	*		Van Buren county: Bloomingdale Twp.	54	0	Van Buren county: Bloomingdale village	32	0
tenaw county: chester township. ne 23—.)	10	0	Jackson county: Norvell township (June 30-July 25.)	3	0			
e county			Oakland county: Novi township (June 24-Aug. 30.)	19	0			
						Gratiot county: Seville township (Apr. 28-July 8.)	25	0
			Ionia county: Ionia city (Apr. 6-June 23.)	107	0	Ionia county: Ionia township (Apr. -July.)	47	0
						Ronald township (May 12-May 25.)	1	0
			Lapeer county: Imlay City village (Apr. 5-June 10.)	75	0	Lapeer county: Imlay township (Apr. 15-July 20.)	50	0
						Hillsdale county: Hillsdale city (June 14-June 21.)	1	0
e county: oit city	11	0	Lenawee county: Adrian city (Mar. 27—.)	6	0	Lenawee county: Cambridge township. (May 12-June.)	3	0
			Oakland county: White Lake township (Apr. 10-May 4.)	7	0	Oakland county: Rose township Waterford township ‡ (Apr. 21-June 28.)	1 7	0 0
			St. Clair county: Casco township (June —.)	1	0			
			Washtenaw county: Pittsfield township (Mar. 15—.)	2	0			
			Wayne county: Plymouth village (Apr. 19-July 21.)	81	0	Wayne county: Canton township (May 5-June 1.)	1	0
			Wayne county: Trenton village (Mar. 20-Mar. 30.)	1	0			
ord county: a township	*		Benzie county: Thompsonville Vil. (May 12-June 6.)	3	0			

e footnotes are on the preceding page.
Waterford township to Independence township, Oakland county, 4 cases.

TABLE 8.—CONTINUED.—*Movement of infection of Measles.*

Number.†	First Localities from which Measles was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
				Allegan county: Wayland township... (Jan. 1-Mar. 20.)	124	4	Allegan county: Manlius township.... (Feb. 6-Feb. 17.)	1	0
				Barry county: Carlton township..... (Mar. 1-Mar. 23.)	5	0			
				Hastings city..... (Feb. 16-June 16.)	70	0			
				Middleville village... (Apr. 15-July 28.)	59	0			
				Emmet county: Petoskey village (May 2-June 1.)	4	0			
				Ionia county: Belding city..... (July 8-July 12.)	1	0			
				Kent county: Ada township..... (Jan. —.)	150	1	Ionia county: Campbell township.. (May 12-May 18.)	2	0
				Cannon township..... (Jan. 27-Feb. 22.)	2	0			
				Lowell village..... (May 2-June 26.)	20	0	Otisco township (Apr.-June 25.)	25	0
				Plainfield township.. (Mar. 10-July 2.)	75	0	Kent county: Bowne township..... (May-June 25.)	3	0
				Walker township (May 5-June 12.)	7	0			
48	Kent county:‡ Grand Rapids city. (All the year.)	3,170	6	Lake county: Ellsworth township.. (Jan. 27-Mar. 5.)	13	0			
				Luther village..... (Jan. 12-May 24.)	135	0			
				Mackinac county: St. Ignace city..... (May 19-July 13.)	15	0			
				Muskegon county: Laketon township... (Mar. 19-Apr. 2.)	1	0			
				Muskegon city (May 21-July.)	----	----			
				North Muskegon city (Mar. 17-Apr. 2.)	1	0			
				Newaygo county: Goodwell township.. (Apr.-Apr.)	5	0			
				Newaygo village..... (May 6-May.)	56	1	Newaygo county: Grant township..... (May 19-June 10.)	2	0
				Ottawa county: Robinson township.. (Apr. 8-May 15.)	11	0			
				Wright township..... (— Feb.)	13	0			
				Wexford county: Cadilac city..... (Apr. 4-June 10.)	35	0			

† * These foot-notes will be found on page 342.

‡ In his annual report, the health officer of Grand Rapids said: "So far as known, the source from which the diseases were derived, were as follows: of measles—'European Immigrants'." In 1893 there were 948 cases of measles in Grand Rapids; and during that year the State Board of Health gave notice to the local health officer of the arrival of 175 immigrants exposed to measles on ship-board, destined for the city of Grand Rapids. During the year 1894 the State Board gave notice of 17 such immigrants destined for Grand Rapids. Such possibly-infected immigrants arrived in Grand Rapids in nearly every month in 1893, and in half of the months in 1894. In 1894 nearly four thousand cases of measles were reported from Grand Rapids and the places to which measles was spread from Grand Rapids. What proportion of these should rightly be charged to infected immigrants, cannot now be told.

TABLE 8.—CONTINUED.—*Movement of infection of Measles* Into Michigan *from outside the State.*

Number.†	First Localities from which Measles was spread.			Second Localities Infected from First.			Third Localities Infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
49	Chicago			Benzie county: Joyfield township.. (June —.)	25	0			
50	Colorado			Kalamazoo county: Kalamazoo city	18	0	Van Buren county: Keeler township	1	0
51	Indiana			Allegan county: Plainwell village... (July 8–July 15.)	2	0			
52	Indiana: South Bend			Cass county: Calvin township... (May 27 —.)	3	0			
53	Ohio			Isabella county: Fremont township. (Apr. 15–May 10.)	4	0			
				Lenawee county: Dover township.... (May —.)	1	0			
				Morenci village.... (Feb. 5–Apr. 30.)	148	0	Lenawee county: Seneca township..... (Feb. 4–Apr. 30.)	43	0
				Midland county: Ingersoll township. (Aug. 1 —.)	2	0			
54	Ohio: Bowling Green			Wayne county: Trenton village.... (Apr. 4–May 30.)	7	0			
55	Ohio: Toledo			Mackinac county: Mackinac village... (Aug. 7–Dec. 30.)	50	0			
				Wayne county: Springwells Twp... (Apr. —.)	12	0			
56	Ohio: West Unity			Hillsdale county: Wright township..	20	0			
57	On shipboard			Wayne county: Wyandotte city..... (Nov. 1–Nov. 20.)	2	0			
58	Pennsylvania			Benzie county: Thompsonville Vill. (July 15–July 31.)	3	0			
59	Wisconsin: Antigo			Ontonagon county: Interior township.. (June 2–July 8.)	7	0			

† The consecutive numbers in this column refer to similar consecutive numbers before the quotations in the text following this table.

TABLE 8.—CONTINUED.—**Probable *Movement of infection of Measles.***

Number.†	First Localities from which Measles was spread.			Second Localities probably infected from First.			Third Localities probably infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
60	Allegan county: Martin township.... (Jan.-Feb.)	75	2	Allegan county: Watson township..... (Feb.-Mar.)	15	0			
61	Barry county: Middleville village.. (Apr. 15-July 28.)	59	0	Barry county: Thornapple township. (June 1-July 2.)	11	0			
62	Calhoun county: Battle Creek city....	*		Barry county: Nashville village..... (May 26-June 3.)	1	0			
63	Kent county: Grand Rapids city .. (Jan.-Dec.)	3,170	6	Kent county: Paris township..... (Apr. 1-Apr. 30.)	13	0			
64	Lake county: Luther village..... (Jan. 12-May 24.)	135	0	Lake county: Dover township..... (Apr. 5-May 11.)	7	0			
65	Saginaw county: Saginaw city.....	506	2	Saginaw county: Zilwaukee township .. (Mar. 3-Apr.)	5	1			
66	Shiawassee county: Owosso city (Feb. 7-July 21.)	189	0	Shiawassee county: Bennington township. (Apr.-July 15.)	50	0			
67	Tuscola county: Vassar village..... (June —.)			Macomb county: Memphis village (Apr. 1-May 27.)	35	0			
68	Wayne county: Detroit city.....	11	0	Wayne county: Taylor township..... (Apr. 6-Apr. 16.)	1	0			

† The consecutive numbers in this column refer to similar consecutive numbers before the quotations in the text following this table.

* Measles was not reported to this office by the health officer of the "first" locality at the time it was said to have spread from there. This may indicate neglect in the locality from which the disease is reported to have spread.

Outbreaks of Measles Traced to Other Jurisdictions.

The following are extracts from reports of health officers who were able to trace the outbreaks of measles in their respective jurisdictions to cases of the disease outside their jurisdictions,—with the name of the health officer, and of the jurisdiction which was the "Second locality," subjoined. In those instances where the disease spread to a third locality, a reference mark and foot-note refer to "Third locality" column in Table 8. These quotations concerning the spread of contagium from first to second, and from second to third localities, are arranged in the same order as the "First localities" in Table 8, thus giving the source of each report in that table.

The consecutive numbers placed before these quotations refer to the same localities as do similar numbers in the first column of Table 8 of this article.

The map on a preceding page graphically exhibits these "movements of measles contagium in the year 1894."

1. "By a young man from Lee township who came down with measles at an exhibition held in school-house."—*S. S. Stout, M. D., Cheshire township, Allegan county.*

1. "From Cheshire."—*W. H. Andrews, M. D., Clyde township,* Allegan county.*

2. "From Martin township."—*Cicero M. Stuck, M. D., Plainwell village, Allegan county.*

3. "First cases were contracted at Wayland [Allegan county], Mich."—*H. M. Brodrick, M. D., Buchanan village, Berrien county.*

4. "Brought from Bridgeman, Lake township."—*Frank A. Votey, M. D., Benton Harbor city, Berrien county.*

5. "From St. Joseph city."—*Frank A. Votey, M. D., Benton Harbor city, Berrien county.*

6. "Exposed in Butler school."—*Joseph E. Daniels, H. O., Clarendon township, Calhoun county.*

7. "One of the family visited in Albion."—*Wm. W. Dean, H. O., Parma township, Jackson county.*

7. "Mr. Lee Butler was in Albion, came home to Parma and the thirteenth day after his return came down with measles."—*C. D. Hubbard, M. D., Parma village, Jackson county.*

8. "From a child exposed in Battle Creek who moved into said township."—*C. A. Scribner, M. D., Barry township, Barry county.*

8. "Imported from Delton [Barry township], this county."—*M. C. Woodmansee, M. D., Hastings city,* Barry county.*

8. "Visitors from Battle Creek."—*Harry L. Barten, H. O., Burlington township, Calhoun county.*

8. "From Battle Creek."—*Julius B. Ells, H. O., Carmel township, Eaton county.*

8. "From Battle Creek."—*L. C. Jones, M. D., Kalamo township, Eaton county.*

8. "From Battle Creek."—*M. Rogers, M. D., Pavilion township, Kalamazoo county.*

8. "Family moved here from Battle Creek, where the patient had been exposed to the disease."—*John N. Swartz, M. D., Hamburg township, Livingston county.*

9. "First case contracted by exposure in township of LeRoy, Calhoun county, and the two probably took disease from friends visiting, bringing contagium with them."—*E. H. Hurd, M. D., Union City village, Branch county.*

10. "Was caught at Grayling."—*Jno. A. Love, clerk, Center Plains township, Crawford county.*

10. "A child belonging to Nelse Olson of Grayling visited at Lewiston, and in the hotel came down with the disease. Children in the hotel contracted disease from him."—*Thos. S. Glenn, M. D., Albert township, Montmorency county.*

11. "Exposure to one sick with the disease in the township of Chester, Eaton county."—*Chas. S. Snell, M. D., Vermontville village, Eaton county.*

12. "From being exposed to the disease at Fenton, Mich."—*Thos. J. Jackson, M. D., Milford township, Oakland county.*

13. "From Bannister—conveyed by F. L.'s children of Lansing, and visiting Bannister [Elba township]. One child taken there July 25, and one had had it at Lansing."—*John J. Travis, M. D., St. Johns village, Clinton county.*

14. "A man went to Lansing on a visit and soon after his return was taken with measles; supposed he was exposed at Lansing."—*Geo. W. Matteson, M. D., Middleville village, Barry county.*

14. "The Bingham St. school in the city of Lansing."—*Oscar V. Reeves, H. O., Lansing township, Ingham county.*

15. "From the school in Mason."—*Geo. W. Swartwout, M. D., Aurelius township, Ingham county.*

15. "Exposed at Mason school."—*Joseph Jewett, H. O., Vevay township, Ingham county.*

16. "Was exposed by a child in Lake Odessa."—*A. J. Wright, M. D., Carlton township, Barry county.*

17. "Was contracted in the village of Saranac."—*Chas. Wunch, M. D., Boston township, Ionia county.*

18. "From Jackson."—*E. E. Moore, M. D., Hillsdale city, Hillsdale county.*

18. "The first case E. S. was exposed to the disease by sitting beside a girl in a street car in Jackson. The rash was well on the girl when E. was exposed."—*E. Emerson, M. D., Spring Arbor township, Jackson county.*

18. "Brought into this jurisdiction by a family who moved here from Spring Arbor, and could all be traced from this case."—*Wm. N. Keeler, M. D., Concord village,* Jackson county.*

19. "From Jackson county."—*Samuel DuBois, M. D., Unadilla township, Livingston county.*

20. "From exposure in township of Norvell."—*E. N. Palmer, M. D., Columbia township, Jackson county.*

21. "From Kent county."—*Jas. D. Campbell, M. D., Hopkins township, Allegan county.*

21. "Contracted from township of Hopkins by visitors to Hopkins from this township."—*N. V. B. McAlpine, H. O., Monterey township,* Allegan county.*

* "Third locality" column in Table 8.

22. "From exposure in the adjoining town of Vergennes."—*Aaron Clark, M. D., Cannon township, Kent county.*

23. "From Chase township."—*Wm. E. Dockry, M. D., Big Rapids city, Mecosta county.*

24. "Exposure of the patients at Oxford, Mich., during a visit."—*D. H. Burley, M. D., Almont village, Lapeer county.*

25. "Came from Hudson, Mich., by a workman from that city."—*E. E. Moore, M. D., Hillsdale city, Hillsdale county.*

26. "From Fowlerville, Livingston county."—*Geo. M. Thompson, H. O., White Oak township, Ingham county.*

27. "Brought in from Romeo, Mich."—*Wm. B. Hamilton, M. D., Berlin township, St. Clair county.*

28. "Source traceable to visitors from Marquette in one case."—*J. F. Menestrina, M. D., Iron Mountain city, Dickinson county.*

29. "Contracted at Ludington."—*Theodore R. McDonald, M. D., Orleans township, Ionia county.*

29. "Brought from Ludington city."—*Wm. C. Martin, M. D., Scottville village, Mason county.*

30. "Came from Monroe, Mich."—*N. D. Yale, M. D., Deerfield township, Lenawee county.*

30. "Was brought from Monroe."—*N. D. Yale, M. D., Deerfield village, Lenawee county.*

31. "In Bloomfield township."—*J. W. Anderson, M. D., Troy township, Oakland county.*

32. "The patient exposed in another jurisdiction [Orion, Oakland county,] and brought the measles home with him."—*Samuel B. Robb, M. D., Addison township, Oakland county.*

33. "From Pontiac."—*J. Goodenough, M. D., Clarkston village, Oakland county.*

33. "From city of Pontiac."—*J. Goodenough, M. D., Independence township, Oakland county.*

33. "From Pontiac."—*Wm. L. Cole, M. D., Oxford village, Oakland county.*

33. "Exposure of the patients at Oxford, Mich., during a visit."—*D. H. Burley, M. D., Almont village,* Lapeer county.*

34. "From a school-girl from Royal Oak village coming down in our school."—*Jno. L. Campbell, M. D., Birmingham village, Oakland county.*

35. "From Franklin [Southfield township]."—*Elliot F. Holcomb, M. D., Farmington township, Oakland county.*

35. "Improper isolation in the township of Farmington."—*Francis T. B. Fest, M. D., Livonia township,* Wayne county.*

35. "Carpenters living here, working in Franklin, supposed to have brought it home with them and their families were first to come down with it."—*Thos. H. Turner, M. D., Farmington village, Oakland county.*

36. "Brought into school from Jamestown."—*W. Chas. Covey, V. S., H. O., Georgetown township, Ottawa county.*

37. "From Saginaw."—*Harry J. Garber, M. D., Hampton township, Bay county.*

37. "Man came from Saginaw into Hampton township, exposed the first case who came to Essexville before she showed symptoms."—*Harry J. Garber, M. D., Essexville village,* Bay county.*

37. "Brought in from Saginaw."—*Wm. Putnam, M. D., Frederic township, Crawford county.*

37. "A man moved into the village from Frederic, Crawford county, where measles was prevalent. He was sick upon his arrival and developed measles immediately."—*G. S. Darling, M. D., Tawas city village,* Iosco county.*

37. "From Saginaw."—*Ephraim McCullough, H. O., Brookfield township, Huron county.*

37. "From Saginaw."—*L. R. Lumby, M. D., Rush township, Shiawassee county.*

37. "From Saginaw."—*D. Ralston, M. D., Cadillac city, Wexford county.*

38. "From Laingsburg."—*H. W. Cobb, M. D., Perry village, Shiawassee county.*

39. "One case, a child brought from Owosso just as she was coming down."—*D. W. Mudge, M. D., Chesaning township, Saginaw county.*

39. "Brought here from Chesaning village."—*J. E. Crosby, H. O., Swan Creek township,* Saginaw county.*

39. "Imported from Owosso."—*J. J. Howard, M. D., Byron village, Shiawassee county.*

40. "By a family moving into the village from Lynn township."—*W. H. Gowan, M. D., Yale village, St. Clair county.*

41. "From Port Huron."—*Geo. P. Hale, M. D., Memphis village, St. Clair county.*

42. "Patient was exposed while visiting in Leonidas township."—*H. M. Arane, M. D., Park township, St. Joseph county.*

* "Third locality" column in Table 8.

43. "Exposure while in Grand Junction [Columbia township, Van Buren county]."—*W. A. Mumbrue, M. D., Bloomingdale township, Van Buren county.*

43. "Exposure from cases in township."—*W. A. Mumbrue, M. D., Bloomingdale village,* Van Buren county.*

44. "The first case exposed in the township of Manchester, Washtenaw county."—*Duncan Hyndman, M. D., Norvell township, Jackson county.*

45. "From Wayne county, Michigan."—*Daniel C. Dunham, Novi township, Oakland county.*

46. "From Detroit."—*R. Logan, M. D., Ionia city, Ionia county.*

46. "Imported from Ionia city by friends visiting in their families."—*Chas. McLachlan, Seville township,* Gratiot county.*

46. "First cases from Ionia city schools."—*F. W. Faulkner, clerk, Ionia township,* Ionia county.*

46. "Exposure to a case in the city of Ionia."—*F. A. Hargrave, M. D., Ronald township,* Ionia county.*

46. "Miss W. C., age 12 or 13 years, visited Detroit with her parents the last of March and contracted measles; the case was not quarantined."—*David V. Yerex, M. D., Imlay city village, Lapeer county.*

46. "Cases in the township of Imlay could be traced directly to those in the village of Imlay city, where the disease had prevailed for several weeks."—*Geo. W. Jones, M. D., Imlay township,* Lapeer county.*

46. "One case imported from Detroit."—*F. E. Andrews, M. D., Adrian city, Lenawee county.*

46. "From Adrian."—*E. E. Moore, M. D., Hillsdale city,* Hillsdale county.*

46. "From the city of Adrian."—*G. W. Ross, H. O., Cambridge township,* Lenawee county.*

46. "From Detroit."—*Wm. B. Stockwell, H. O., White Lake township, Oakland county.*

46. "Taken at White Lake meeting."—*Robert C. Stiff, H. O., Rose township,* Oakland county.*

46. "From White Lake township."—*Elsworth Orton, M. D., Waterford township,* Oakland county.*

46. "Child brought from Detroit to visit friends in Casco."—*C. W. Shaver, M. D., Casco township, St. Clair county.*

46. "Brought from Detroit."—*Morton F. Chase, H. O., Pittsfield township, Washtenaw county.*

46. "By exposure to infected child from Detroit."—*J. M. Collier, M. D., Plymouth village, Wayne county.*

46. "From attending school in Plymouth."—*Henry F. Homer, Canton township,* Wayne county.*

46. "Patient contracted disease in school at Detroit and came to Trenton on a visit."—*H. Holden, M. D., Trenton village, Wayne county.*

47. "From the town of Boon (Wexford county), Michigan."—*C. B. Marks, M. D., Thompsonville village, Benzie county.*

48. "From European emigrants."—*Thos. D. Bradfield, M. D., Grand Rapids, Kent county.*

48. "A young lady came from Grand Rapids to her home in Wayland and visited the school, next day came down with measles and from that it spread through the township."—*C. W. Andrews, M. D., Wayland township,* Allegan county.*

48. "Brought by E. J. from Grand Rapids."—*A. J. Wright, M. D., Carlton township,* Barry county.*

48. "From Grand Rapids."—*Geo. W. Lowry, M. D., Hastings city,* Barry county.*

48. "A child visiting in Grand Rapids contracted the disease and infected our school with it before it was known."—*Geo. W. Matteson, M. D., Middleville village,* Barry county.*

48. "Was brought from Grand Rapids, Michigan."—*A. G. Oven, M. D., Petoskey village,* Emmet county.*

48. "Patient visited a child in Grand Rapids, afflicted with the disease."—*F. B. Meloche, M. D., Belding city,* Ionia county.*

48. "From Grand Rapids."—*L. F. Van Amburg, M. D., Ada township,* Kent county.*

48. "Brought from Grand Rapids."—*Aaron Clark, M. D., Cannon township,* Kent county.*

48. "From Grand Rapids."—*Otto C. McDannell, M. D., Lowell village,* Kent county.*

48. "From Grand Rapids city."—*Wm. Hyser, M. D., Plainfield township,* Kent county.*

48. "From the city [Grand Rapids]."—*S. J. Stewart, H. O., Walker township,* Kent county.*

48. "From Grand Rapids."—*Earl Fairbanks, M. D., Ellsworth township,* Lake county.*

48. "From Grand Rapids."—*Earl Fairbanks, M. D., Luther village,* Lake county.*

48. "Was brought from Grand Rapids by a child suffering with the disease."—*W. G. Young, M. D., St. Ignace city,* Mackinac county.*

48. "Been to Grand Rapids visiting, contracted the disease there."—*P. W. Pearsall, M. D., (H. O. of North Muskegon), Laketon township,* Muskegon county.*

48. "Came from Grand Rapids."—*Paul A. Quick, M. D., Muskegon city,* Muskegon county.*

48. "From Grand Rapids."—*P. W. Pearsall, M. D., North Muskegon city,* Muskegon county.*

48. "In Grand Rapids."—*Floyd Reynolds, H. O., Goodwell township,* Newaygo county.*

* "Third locality" column in Table 8.

48. "Brought here from Grand Rapids."—*Newton M. Mussey, M. D., Newaygo village,* Newaygo county.*

48. "The first case sick went to Grand Rapids, was exposed, came home and took sick."—*Chas. E. Stearns, H. O., Robinson township, Ottawa county.*

48. "From Grand Rapids city."—*Chas. E. Chappell, M. D., Wright township,* Ottawa county.*

48. "Families coming from Grand Rapids."—*D. Ralston, M. D., Cadillac city,* Wexford county.*

49. "From Chicago."—*H. Lathwell, clerk, Joyfield township, Benzie county.*

Movement of Infection from Outside the State.†

50. "From Colorado."—*Adolph Hochstein, M. D., Kalamazoo city, Kalamazoo county.*

50. "From Kalamazoo."—*Sam'l Stevens, H. O., Keeler township,* Van Buren county.*

51. "A little girl from Indiana, who directly exposed the two little ones."—*Cicero M. Stuck, M. D., Plainwell village, Allegan county.*

52. "From South Bend, Ind."—*A. R. Byrd, clerk, Calvin township, Cass county.*

53. "Brought by immigrants from Ohio."—*Allen Keen, M. D., Fremont township, Isabella county.*

53. "Brought from Ohio."—*W. J. Hathaway, H. O., Dover township, Lenawee county.*

53. "Several students of our school are residents of Ohio where they were exposed while attending religious meeting."—*Sam'l Stevenson, M. D., Morenci village, Lenawee county.*

53. "Most of the cases were exposed in our school at Morenci."—*Sam'l Stevenson, M. D., Seneca township,* Lenawee county.*

53. "From Ohio, by a visiting friend."—*C. R. Hamilton, M. D., Ingersoll township, Midland county.*

54. "From Bowling Green, Ohio."—*H. Holden, M. D., Trenton village, Wayne county.*

55. "Imported from Toledo, Ohio."—*Jas. H. Bogan, M. D., Mackinaw village, Mackinac county.*

55. "From Toledo."—*Fred J. Clippert, M. D., Springwells township, Wayne county.*

56. "Brought from West Unity, Ohio."—*W. F. Barnes, M. D., Wright township, Hillsdale county.*

57. "Patient contracted disease on ship board; mingling with immigrants. It was an isolated case and the only one of this outbreak."—*N. T. Langlois, M. D., Wyandotte city, Wayne county.*

58. "From a party who was taken down here on arrival from Pennsylvania."—*C. B. Marks, M. D., Thompsonville village, Benzie county.*

59. "Brought here from Antigo, Wisconsin."—*R. H. Sturgeon, M. D., Interior township, Ontonagon county.*

Outbreaks Probably Traced to Former Outbreaks.

60. "Unknown, but probably from Martin, an adjoining township."—*Wm. McDougal, H. O., Watson township, Allegan county.*

61. "Supposed to have been at Middleville when an extensive epidemic of measles was prevailing."—*G. W. Matteson, M. D., Thornapple township, Barry county.*

62. "Probably from exposure to disease at Battle Creek."—*R. P. Comfort, M. D., Nashville village, Barry county.*

63. "Supposed to be from the city [Grand Rapids.]"—*H. B. Rathburn, H. O., Paris township, Kent county.*

64. "As near as I could tell it came from Luther."—*Jas. P. Stevens, H. O., Dover township, Lake county.*

65. "Probably from Saginaw."—*Jas. J. Lyon, M. D., Zilwaukee township, Saginaw county.*

66. "Perhaps from Owosso."—*Chas. Shickle, M. D., Bennington township, Shiawassee county.*

67. "The exact source is not known but the first case so far as traced was a little fellow visiting here from Vassar."—*Geo. P. Hale, M. D., Memphis village, Macomb county.*

68. "Not known but supposed to have contracted the disease in Detroit as he usually went there once a week."—*Byron Hodges, M. D., Taylor township, Wayne county.*

NEGLECT OF MEASURES TO RESTRICT MEASLES, VIOLATIONS OF PUBLIC-HEALTH LAWS, ETC.—RESULTS.

Neglected Outbreak of Measles in Concord village, Jackson county.

An outbreak of measles occurred in Concord village, Jackson county, which lasted from April 16, to August 3, 1894, and in which there were 69 cases. The following quotation from Wm. Keeler, M. D., health officer of the village, shows that this outbreak was caused by neglecting to

* "Third locality" column in Table 8.

† *Numbers 48* on pages 349-350 might, perhaps, be included under this head.

isolate the first case: "Brought into this jurisdiction by a family who moved here from Spring Arbor, and could all be traced from this one case. They lived near the school house, and he mingled with the children at recess and other times."

Neglected Outbreak of Measles in Allendale township, Ottawa county.—Failure to appoint a health officer.

April 16, 1894, William Walter, justice of the peace and member of the local board of health of the township of Robinson, Ottawa county, wrote to the Secretary of this Board relative to a neglected outbreak of measles in the adjoining township of Allendale, where the local board of health had neglected to appoint a health officer. Mr. Walter's letter was as follows:—

"Measles seems to be prevalent in the township of Allendale, county of Ottawa, Mich., and the board of health has not caused said houses to be placarded or taken any means to prevent the spread of the same, and there are now eight families down with the measles, or it is so reported, they are sick and I am satisfied that it is measles. I, as a member of the board of health of the township of Robinson, was required by said board to look after said cases of measles and prevent if possible the spread of the same into the town of Robinson, and in such discharge of duty I did call upon the acting township clerk of Allendale to learn who the health officer was and was informed that they did not have any, and further said 'What are you going to do about it?'

"In the face of this opposition I see no other way for me but to appeal to you, and I can assure you that the matter needs immediate attention."

April 18, the Secretary of this Board answered the above-quoted letter from William Walter, as follows:—

"DEAR SIR:—Accept thanks for your letter of April 16, relative to measles in Allendale township. I have written to the supervisor of that township relative to the subject, and I trust that he will take action at once to restrict the spread of the disease. I have also called his attention to the law which requires every board of health to appoint and constantly have a health officer.

"In order for your board of health to be ready at all times to take prompt action to prevent the introduction of dangerous communicable diseases into your jurisdiction, you should make and publish regulations as required by sections 1636 and 1639, Howell's Statutes. These sections of law may be found on page 7 of the enclosed pamphlet. Perhaps you have made and published such regulations already.

"Trusting that the people of your township may not be further endangered by the presence of measles in the adjoining township of Allendale." * * *

Measles Carried from Grand Rapids to Hastings City, Barry County.

G. W. Lowry, M. D., health officer of the city of Hastings, wrote to the Secretary of this Board, March 6, 1894, relative to a neglected outbreak of measles in his jurisdiction, as follows:—

"Please send me circulars on restriction and prevention of measles.

"A family by the name of Fox, moved in here from Grand Rapids, with three children of school age. They attended the Congress street school of Grand Rapids, while pupils were being sent home sick with measles. In nine days after moving here, that is Feb. 15, one of these children came down sick with measles in the first ward school and a few days later a second one. They did not employ a doctor, and did not report, so now we have this general outbreak by carelessness of one family. The first news I got was March 3.

"They make excuse of ignorance of the law, and said they had scarlet fever in the Rapids and did not have to report nor placard the house, nor hinder anybody from visiting them, etc.

"They say these little towns are always cranky and exact more than cities of large size. * * * Some doctors will insist the disease cannot be carried in clothing, etc., so I will have a chance to earn my $40 salary."

Dr. Lowry wrote to this office again March 8, relative to measles in his jurisdiction, as follows:—

"I send this final report of diphtheria. * * * I should like 50 circulars on measles to distribute to our citizens for they certainly need educating. The argument predominates that this is a good time of the year to have measles, etc.

"Our school board would not allow us to close the ward school so the teacher sits in the school-room with one or two scholars. The greatest number during the last week was three pupils.

"Have you a good sample or paper that is concise and to the point, that we might induce our local papers to publish. I was too late to publish anything this week."

March 10, the Secretary of this board sent the following letter to Dr. Lowry:—

"Dear Sir:—Accept thanks for your final report of case of what was at first supposed diphtheria, which began Feb. 15, 1894, also for your letter relative to measles.

"We have nothing, for distribution, on measles except the pamphlet [176], on the restriction and prevention of that disease, a marked copy of which I enclose herewith. It is of great importance that the disease be restricted as much as possible. The average number of deaths in this State is about two hundred per year. In England and Wales, the number of deaths from that disease in 1892 was 14,732, which exceeded the number of deaths from scarlet fever and diphtheria combined.

"Although the person sick with measles generally recovers, the after effect of the disease is sometimes very serious.

"I send you by this mail 50 copies of the pamphlet on the restriction and prevention of measles, as you request, also a reprint from the annual report of this Board for the year 1891, on pages 238-46 of which can be found an interesting article on measles."

Dr. Lowry wrote to this office again, Mar. 18, as follows:—

"Please send me another record sheet, also 50 more circulars on restriction, etc. of measles.

"We are likely to have 100 cases of measles before this outbreak is closed. It would take all the police force in Chicago to properly govern the people and the ignorant carelessness of some of our physicians here. In reference to this outbreak of measles, viz., Dr. ——, told me to-day, it was all right for the children to have the measles now, it is a good time; he never lost a case from measles in his life, etc.

"I cannot afford to spend my whole time over the matter, without pay or appreciation. If I am not too late I will keep my own children out of school and advise others to do the same. Any advice from you will be gladly received."

Neglected Outbreak of Measles in Meridian Township, Ingham County.

W. N. Diamond, M. D., health officer of Meridian township, Ingham county, made a final report to this office, June 18, 1894, relative to a neglected outbreak of measles in his jurisdiction in which there were 5 cases and 1 death. The source of the infection was unknown; cases were not isolated, and there was no attempt at disinfection. In a letter to this office Dr. Diamond stated as follows:—

"Mr. Culver's family had the measles and Mrs. C. died. Dr. —— —— attended them. I understand he told them it would be all right to have a public funeral at the house, so they did. I did not know she had died until the services were half over so I could do nothing. The funeral service was held at the house and it was as full as could be packed.

"The doctors of this place are very obstinate, and claim it is not law and will not report measles.

"At Mr. Culver's I left a pamphlet at the commencement of their troubles, and requested them to read it and have their doctor read it.

"Now what had I better do? I suppose it will go on in this way until they are given to understand they cannot do so."

May 23, 1894, the Secretary of this Board wrote in answer to the above-quoted letter from Dr. Diamond, as follows:—

"Dear Sir:—Accept thanks for your letter of May 22 relative to measles. Referring to the apparent violation of the public-health laws, you ask 'What had I better do?' I would suggest that you comply with the law (Act 137, laws of 1883), which requires you to order the isolation of all persons sick or infected with any 'disease dangerous to the public health', etc. If you have already done so in the instance which you mention, and your orders have been disobeyed, then it is your duty to give notice of the disobedience to the supervisor of your township, and it is his duty to bring suit in the name of the people of this State for the recovery of any forfeiture or penalty which may have been incurred. I have marked the law in the enclosed pamphlet, which bears upon the subject.

"Your orders if properly and clearly made under the law are paramount to any suggestions which the attending physician may make relative to isolation, etc., and if the householder or other persons willfully disobey your orders, they are liable to prosecution under section 2, of Act 137, Laws of 1883. If attending physicians refuse or neglect to report cases of dangerous communicable diseases under their professional care, to the health officer, or to the president or the clerk of the local board of health, they are liable to prosecution as provided in section 1678, Howell's Statutes, and the law requires the health officer to give notice to the supervisor."

Neglected Outbreak of Measles in Saranac Village, Ionia County.

Dr. Charles Wunch, health officer of Saranac village, Ionia county, wrote to the Secretary of this Board, May 29, 1894, for information relative to an outbreak of measles in his jurisdiction, as follows:—

"Please inform me, is it out of order to have a man sworn if you are doubtful about him cleaning up good after measles? I required that of a doctor here. * * *

"Please send me more of the papers on measles, as there is measles now in about 25 families in my jurisdiction and prospects of more."

The Secretary of this Board answered Dr. Wunch's letter, May 31, as follows:—

"Accept thanks for your reports for the week ending May 26, relative to measles in the village of Saranac and Boston township, and for your letter of May 29, relative to the same subject.

"You ask, 'Please inform me, is it out of order to have a man sworn, if you are doubtful about him cleaning up after measles?' I think it is, unless the man is brought into court upon a complaint that he has violated the public-health laws, or the orders of the health officer made in accordance therewith. I am not clear as to your meaning when you say 'cleaning up good after measles'. If you mean the disinfection of rooms, clothing and premises, it is not the physician's nor the householder's duty to do that; but ('unless he is or shall have been instructed' to do otherwise, by the board of health), it is the duty of the health officer. If the 'man's' premises are in such an unsanitary condition that they are a nuisance, it is the duty of the local board of health to investigate the subject as provided by law.

"If your orders as health officer, concisely and explicitly made in accordance with the law, are disobeyed, it is your duty to give notice to the prosecuting attorney of your county, if such disobedience is in the village; if in the township, you should give notice to the supervisor. I enclose pamphlets marked bearing upon the subject."

Dr. Wunch wrote to this office again, June 10, as follows:—

"The person in question in my letter of inquiry to you is a doctor whose servants had the measles in his house. Yes, I meant to disinfect. Now if it is out of order to have him swear that he has disinfected properly, where is the law to make me give him a permit to send children to school if I have a good reason to believe he did not disinfect as the law requires to be done. Here you may say it is my duty to do disinfection. The village and town boards say I need not do it but order them [householder or physician] to do it.

"I would say, if the State says I must do it let the State also say that the State will amply pay me for it. I wrote you once asking what should be done when a doctor does not report according to law, and

the Prosecuting Attorney says he will pay no attention to it unless it is small-pox or yellow fever. You said, 'Well, you did your duty'; I will say this is a great consolation to me, coming as it does from the State Board of Health. Why did you not say, if the Prosecuting Attorney does not attend to it we will see to him? Please answer my questions."

In reply to the above-quoted letter from Dr. Wunch, the Secretary of this Board wrote, June 13, as follows:—

"Dear Sir:—Accept thanks for your reports and letter of June 10, relative to measles. Act 137, Laws of 1883, requires you to do certain duties unless you are or shall have been instructed by your board of health of which you are executive officer, '*to do otherwise.*' If your board of health has ordered you *not* to disinfect, you will have to obey its orders. I do not think that any board of health has the power to compel householders to do their own disinfecting; and if your board has instructed you to not disinfect, I do not think that the householder will be required to obtain a permit from you before he may send his children to school. There is no law requiring a health officer to give permit. If he gives one it is on his own judgment."

In his final report of the outbreak Dr. Wunch states that there were 63 cases in 37 households in his jurisdiction. All cases were ordered to be isolated from all persons except nurse and physician, but none of them complied with the orders. The health officer adds, "The disease was so light and the weather so favorable that it was not considered necessary by the local board." Disinfection was very incomplete.

They were working under a false impression: Mild cases of measles should be isolated and disinfection carried out the same as in a malignant outbreak, as mild cases will communicate the disease to other persons and the outbreak may at any time take on a severe form.

Prosecution for Disobedience of Public-Health Laws.

Dr. E. N. Palmer, health officer of Columbia township, Jackson county, wrote to the Secretary of this Board, July 18, 1894, relative to an outbreak of measles in his jurisdiction, in which parties disregarded orders to remain in quarantine, and were prosecuted. The following is a copy of Dr. Palmer's letter:—

"Measles,—L, K., aged 14. Taken sick July 13, 1894; exposed from 1st to the 4th of July.

"This case has the following history: Dr. Hyndman of Norvell township, wrote me on July 7, of her exposure, and of advising her to remain where she was until well. Instead she skipped for home, July 4. The 9th the Supervisor gave me the doctor's letter, and instructed me to do what was necessary. I saw the girl's father immediately, notified him of the situation and ordered him to keep her on his own premises until the 21st. He informed me he would do as he pleased, but he kept her in. To-day I went to see him (not hearing anything further), to remove quarantine, when he informed me that she had been sick since Saturday, the eruption coming out on Sunday. The rest of the family (numerous) have been running the streets, until Monday, to my certain knowledge. He is still running the street although he is a resident of the township.

"Do you consider it necessary for Act 137, laws of 1883, to be published by the local board before it becomes operative?"

Doctor Palmer wrote to this office again, Aug. 13, as follows:—

"In regard to the case of measles reported to you July 18, I have had some trouble. The father refused to obey quarantine regulations, tore down placard, it is supposed, and allowed his children to run the streets. I made complaint to prosecuting attorney who ordered a warrant for his arrest, but on his pleading guilty let him off with paying the costs. Luckily the disease has not spread as yet."

Neglected Outbreak of Measles in Gaines township, Kent county.

March 16, 1894, J. K. Hanna, M. D., health officer of Gaines township, Kent county, made the following final report, of an outbreak of measles in his jurisdiction in which there had been about 50 cases, and no attempt at restricting the spread of the disease had been made:—

"Dear Sir:—As the board of health of this township thought it unnecessary to go to the expense of investigating and reporting measles, placarding premises, etc., it is impossible for me to make a report that would be of any value.

"I can only say that we had an extensive epidemic, with no deaths.

"Efforts at restriction of measles, as it seems to me would be entirely fruitless."

Fumigation prevented by parties in Imlay City village, Lapeer county.

May 20, 1894, W. Flagler, M. D., wrote to the Secretary of this Board, relative to an outbreak of measles in his jurisdiction in which he had attempted to fumigate the property but had met opposition at the hands of the householders and attending physician. Doctor Flagler's letter stated as follows:—

"Acting in the line of duty, I undertook to fumigate the chamber of a house, yesterday, where they had had measles, but was forbidden to do so by the owner and his wife—both very ignorant people. I got the village marshal to assist me, and then had to threaten to get out a warrant and arrest them before the owner would consent. His wife pretended to have asthma, and said she could not stand the sulphur fumes, but she *would* go upstairs to witness the operation. When I ignited the sulphur she would not come down until her lungs were so full she could not stand it any longer. Of course she coughed some and her husband sent for Dr. Geo. W. Jones—my predecessor—to come. He arrived about three minutes after we left. He immediately ordered the chamber opened and the sulphur thrown out of the window, and it was done. What would be the proper course for the Board to pursue in such a case? Unless he is punished or censured promptly for his meddlesome interference, I shall resign, and I have so instructed the President, Hon. N. Haskin.

"A special meeting will be held Tuesday night to consider the matter. Please reply promptly."

In reply to the above-quoted letter from Dr. Flagler, the Secretary of this Board wrote, May 21, 1894, as follows:—

"Dear Sir:—Accept thanks for your letter of May 20, and for the weekly reports on blanks 'M', for the weeks ending May 12, and 19, relative to measles. I note what you say relative to the difficulty which you had in your attempt to disinfect premises where measles had been present, and the interference of Dr. Geo. W. Jones. You ask—'What would be the proper course for the board to pursue in such a case?'

"Section 2, of Act 137, Laws of 1883, makes provisions for the punishment of any one who 'knowingly violates the provisions of section one of this Act, *or the orders of the health officer made in accordance therewith*', and I would suggest that you give notice to the prosecuting attorney of Lapeer county, without delay, who is required by section 8442 Howell's Statutes when he 'shall know or have good reason to believe that a penalty or forfeiture has been incurred within his county, it shall be the duty of such prosecuting attorney, without delay, to prosecute for such penalty or forfeiture.' From what you say, I think a penalty has been incurred by Dr. Jones, and you should give notice to the prosecuting attorney as required.

"If the owner of the premises ('and his wife') where the attempt was made to disinfect, assisted in disobeying your orders, they should be prosecuted as well as Dr. Jones. Possibly they did all the disobeying?

"I trust that you and your board of health will take active and vigorous measures to prevent the spread of dangerous communicable diseases within your jurisdiction. And one measure is to see that the orders of the health officer made under law are strictly obeyed."

May 22, 1894, Geo. W. Jones, M. D., wrote to the Secretary of this Board, relative to the matter of disinfection, mentioned in the above-quoted letter, as follows:—

"Dear Sir:—I understand from N. Haskin, Esq., President of this village, that Dr. W. Flagler has represented to you that I interfered with him in the performance of his official duties as health officer on the 19th inst. In reply I would say the charge is absolutely false. On the morning of the above date I was summoned in haste to the house of H. Foster. Upon my arrival I found the house filled with the fumes of burning sulphur, and Mrs. Foster in *spasms*. The children were coughing and strangling and everything about the house in a state of disorder and confusion. The family occupied a small wooden structure and the fumes of the burning sulphur readily gained an entrance to every apartment.

"There had been one solitary case of measles in the family, the other members having previously had the disease. The air in the house was irrespirable and before I could administer to my patient was compelled to admit *fresh air*. The morning was wet and cold, rendering it impossible to turn this family out in the street. Under the circumstances I did what you or any other physician would have done—I ordered the fumigation to cease for the time being. I am alive to the importance of disinfection and other measures to prevent the spread of contagious diseases, but I think health officers should exercise discretion and a little common sense in the performance of their official duties. I am prepared to defend my conduct in the matter complained of to the fullest extent and court the closest investigation."

The Secretary of this Board wrote, May 23, 1894, in answer to the above-quoted letter from Dr. Jones, as follows:—

"Accept thanks for your letter of May 22, relative to measles in the family of H. Foster, in your village, and relative to the attempted disinfection of the premises by the local health officer. I am informed that the health officer was forbidden to disinfect the chamber in which the sick person had been and that it was necessary to call upon the village marshal for assistance before he was allowed to begin the operation, that the wife '*would* go upstairs to witness the operation,' and would not come down until partially overcome by the fumes of burning sulphur. It is possible that you were not aware of the facts in the case. The law requires the health officer to disinfect, and it is just as necessary to disinfect where one case of measles had been as if there had been a dozen cases. The disinfection of a room always necessitates vacating it, and it is sometimes impossible to remain in adjoining rooms, in which case the board of health should provide some temporary shelter for the inmates while the disinfecting is being done. Of course the health officer should use discretion, but no one should interfere with him while he is performing his duties which are required of him by law. If he does not perform his duties, he is liable to prosecution."

Dr. Flagler wrote to the Secretary of this Board again, July 14, as follows:—

"Dear Doctor:—Perhaps you will recall some correspondence last May with reference to the interference of Dr. G. W. Jones, with my work as health officer of this village. You advised the village board to report the case to the Prosecuting Attorney of Lapeer county.

"I referred your letter to the Board, and accompanied it with my resignation conditioned upon their proceeding against Dr. Jones. They promptly accepted my resignation and appointed Dr. D. V. Yerex my successor. I was glad to be relieved of the disagreeable, thankless task, but chagrined to think that Dr. Jones should be allowed to go 'Scott free' after such a flagrant infringement of the law, and disregard of professional courtesy.

"The epidemic of measles was practically at an end when I was deposed. * * *

"I never expect to be health officer of the village of Imlay City again. No one is in sympathy with the law, and all seem to conspire to defeat its execution. They need educating. You should hold a sanitary convention here."

In answering the above-quoted letter from Dr. Flagler, the Secretary of this Board wrote expressing his regret that the local Board of Health of Imlay City did not feel inclined to rigidly enforce the public-health laws.

Measles Spread by a Roving Band of Indians, in Cedar Township, Mackinac County.

C. W. Logan, M. D., health officer of Cedar township, Mackinac county, wrote Dec. 10, 1894, to the Secretary of the State Board of Health, relative to an outbreak of measles in his jurisdiction, in which he

traced the source of infection to a band of Indians who visited the lumber camps. He ascribed the spread of the disease within his territory to the over-crowding of the dwellings in the camp. Dr. Logan's letter stated as follows:—

"Dear Sir:—In regard to the outbreak of measles in our section: The situation is in a lumber camp where they are all huddled together in small log cabins and one large camp occupied by unmarried men so that exposure is very great, but this alone would be slight if it were not for the Indians who are ever on the tramp, work a few days then run around and visit their neighbors; feasting together, using same dishes, etc. How to get around this moving class I do not know. They have their own medicine men and the disease goes its rounds and the white people take it, and that is the first we know of it; the same with consumption, it is bad here, and has caused several deaths but nothing is known of that until after they are buried.

"I submit my situation to you as it would be almost impossible to quarantine a lumber camp, but I will try to isolate as much as possible, and restrict to the place it is in."

Neglected Outbreak of Measles in the City of Monroe.

Geo. F. Heath, M. D., health officer of the city of Monroe, wrote to the Secretary of this Board, May 2, 1894, relative to a neglected outbreak of measles in his jurisdiction, in which there occurred 104 cases, as follows:—

"In my report for week ending April 30, I stated that measles was prevalent in this city. At that time the cases were few, since then three of the teachers in our schools, and perhaps over a hundred of the pupils have come down with it, and in all probability everyone in the Union schools of our city who have not had the measles will come down with it, for all certainly have been exposed.

"I have been at a loss just what to do in the matter. Have looked over Board of Health reports (I have none however since 1890) for some guidance but in vain. There seems to have been no organized effort as far as I can learn, either by the State Board or any local board. I realize that it is an epidemic hard to handle and one that cannot be handled as we would feel bound to were it diphtheria, scarlet fever or small-pox, for an isolation or quarantine of this class here now would virtually close up our schools and paralyze all business, and in these time when every laboring man must work, this seed-time of the year, and the season of fruition of the school year, such quarantine would be impracticable if not impossible.

"I regard this as a favorable time of the year for such an epidemic and such cases as I have seen or heard of are doing nicely.

"While feeling my inability to restrict the epidemic in the city I have thought that something might be done in the schools so that the work there might go on at least in the higher and more important grades, and with this end in view I called a meeting of our board, and the resolutions (herewith enclosed) were unanimously adopted.

"For reasons heretofore given nothing was done in effort to restrict or prevent the epidemic in this city farther than its relation to our schools, though we are desirous of co-operating in any way practicable with your Board, if you have any methods to suggest."

The following is a copy of the resolutions mentioned in the above-quoted letter from Dr. Heath:—

"BOARD OF HEALTH OF THE CITY OF MONROE.

"*For the Regulation and Prevention of Measles in the Schools of City of Monroe.*

"The following rules were adopted at a meeting of the above Board of Health, held May 1, 1894:

"These are prohibited attendance,—

"I. Such teachers or pupils as are in either the incubative (catarrhal) or eruptive stages of the disease or with whom 14 days have not elapsed since the beginning of the eruptive stage.

"II. Such teachers or pupils who come from residences where measles are prevailing.

"III. Such teachers or pupils who may be debarred under above rules shall not be re-admitted, (1) under two weeks from the beginning of the eruptive stage, and (2) for a reasonable period after the subsidence of the disease and then only on a written statement from the physician, parent or guardian to that effect.

"The superintendents or officers in charge of the different schools of the city are required by this Board to aid in the enforcement of these rules.

"Moved and supported that this action of the Board be served on the various school superintendents or officers by the city clerk."

[Signed by the Mayor, Health Officer, and four Members of the Health Committee of the Council.]

Request for Information Relative to the Restriction of Measles.

Dr. Chas. Shickle, health officer of Bennington township, Shiawassee county, wrote as follows to the Secretary of this Board, July 25, 1894, asking for information relative to the methods of isolation and disinfection which should be observed in outbreaks of measles:—

"Dear Sir:—I have recommended and urged every case which came under my notice in time, to disinfect premises; and have distributed pamphlets of instruction to adjoining families.

"Should health officer disinfect all premises following an outbreak of measles in country districts, where the chance of spreading is very slight, thus causing the township expense? Should the disinfection be as thorough and complete in measles as in the more dangerous diseases? If so should not the board of health of township or village join with health officer to enforce the law?

"I confess that as a rule this whole work of enforcing and carrying out the law relative to diseases dangerous to the public health in townships and villages (this township included), depends upon the work of the health officer entirely. And in many epidemics of a mild nature the health officer is unable to carry out the above-mentioned work to the letter. I make the above queries, and the statements as explanatory of the difficulties to the work of health officers of townships and country districts. Please let me hear from you in regard to same and oblige."

In answer to the above-quoted letter from Dr. Shickle, the Secretary of this Board wrote, July 26, as follows:—

"Dear Sir:—Accept thanks for your letter of July 25, and 'final' report relative to measles. Your final report is very incomplete, and gives but little information relative to the outbreak.

"In your letter you ask, 'Should health officers disinfect all premises following an outbreak of measles in country districts, where the chance of spreading is very slight, thus causing the township expense?' Yes; unless he 'is or shall have been instructed by the board of health, of which he is an executive officer, to do otherwise'. (See section 1, of Act 137, Laws of 1883, pages 3 and 4 of the enclosed pamphlet.)

"'Should the disinfection be as thorough and complete in measles as in the more dangerous diseases?' Yes.

"'If so, should not the board of health of township or village join with health officer to enforce the law?' Yes; but unless the health officer has been instructed by his board of health 'To do otherwise,' he is required to comply with Act 137, laws of 1883. If his orders, made plainly, so that he is quite sure that they are understood, and made in accordance with the law, are disobeyed, he is required to give notice of the disobedience of his orders to the supervisor of the township, who is also the president of the board of health, who is 'Forthwith to commence and prosecute a suit, in the name of the people of this State'. See section 8439, Howell's Statutes, page 2 of the enclosed pamphlet."

Neglected Outbreak of Measles in Venice Township, Shiawassee County.

Wm. H. White, health officer of Venice township, Shiawassee county, wrote to the Secretary of this Board, July 25, 1894, relative to a neglected outbreak of measles in his jurisdiction, as follows:—

"Received yours of the 17th instant relative to the outbreak of measles in this township of Venice, county of Shiawassee.

"I do not see how I can fill out the report blank forwarded by you under the circumstances, I will endeavor to report understandingly.

"We had an outbreak of German measles in the spring of '94, I cannot state the exact date. During the epidemic there were cases coming down with the red measles and they were supposed to be German measles until developed, and by that time there were a great many exposed and it went through two school districts and about all the pupils had the red measles that had not had them before. There was one death, a girl three years of age, namely Verney Baker. There were 5 adults and about 50 under 20 years of age, as near as I can ascertain. There was no case reported to me, and a doctor was not called except in a few instances. I saw the doctor in regard to the matter but he said he never paid any attention to measles as regarded reporting or placarding in country places. I saw the school director of one district about closing the school as the pupils were getting well and going back to school and the school was not closed. I notified the directors of the other district that some of the pupils in his district had been exposed to the measles and to take precautions to prevent its spreading. I distributed the pamphlets on measles you forwarded to me in the districts where the measles were prevalent and it seemed all I could do under the circumstances as the health officer is not and will not be very well received until the doctors do their duty better than they do now.

"There has been no case of measles in the township since June to my knowledge. I believe this is about all the information I can give you in the premises."

Neglect to Restrict Measles.—Ways in which this Disease is Spread.

The following quotations from reports to this office, show how people disregard the measures for the restriction of measles. In one instance it is carried by a physician, in another by a professional nurse, in the third instance by mingling with infected immigrants. This latter source of contagium is thought to be quite a common origin of outbreaks of communicable diseases in Michigan. The Secretary of this Board has notified local health officers whenever he has learned that immigrants from infected vessels were destined for their jurisdictions.* It is expected that the health officer will place such possibly-infected persons under surveillance until the expiration of such time as they themselves would be likely to develop the disease. If all their baggage, clothing, etc., could be disinfected, it would probably prevent many outbreaks of communicable diseases.

The fourth instance given below, shows a very common source of infection, that of teachers and pupils taken sick in the public schools. This might be avoided if possibly-infected persons were kept in isolation during the period of incubation.

"Source traceable to visitors from Maryville in one case; in the other to the physician who attended it, as in a few days after a case developed in his household."—*J. F. Menestrina, M. D., Iron Mountain city, Dickinson county.*

"Was brought from Grand Rapids by Miss F., a professional nurse, who came to Petoskey to take care of Mrs. P., who was at the Cushman house."—*A. G. Oven, M. D., Petoskey village, Emmet county.*

"Patient probably contracted disease on shipboard, mingling with immigrants. It was an isolated case and the only one of this outbreak."—*N. T. Langlois, M. D., Wyandotte city, Wayne county.*

Joseph E. Daniels, health officer of Clarendon township, Calhoun county, in the final report of an outbreak of measles in his jurisdiction, stated as follows relative to the source and spread of the disease:—

* In a footnote to Table 8—Continued, page 344, is an account of such notices of immigrants exposed to measles who went to Grand Rapids in nearly every month in 1893 and in half of the months of 1894. It is a significant fact that nearly four thousand cases of measles were reported to have occurred in Grand Rapids and places to which measles spread from Grand Rapids, in 1894.

"The teacher was taken sick with measles and she exposed the school. I was notified on the eleventh and there were nine cases.

"The Supervisor thought it was not necessary for me to disinfect the houses, the people could do that themselves. I left documents so they could know what to use as disinfectants."

OUTBREAKS IN WHICH ISOLATION AND DISINFECTION WERE ENFORCED.—RESULTS.

The following is the substance of a few representative statements of health officers whose reports indicated that they had quite fully enforced isolation in outbreaks of measles:—

Outbreak of Measles in Clyde Township, Allegan County.

W. H. Andrews, M. D., health officer of Clyde township, Allegan county, in the final report of an outbreak of measles in his jurisdiction, stated as follows relative to the methods of restriction used and the results: The infection was from outside of my jurisdiction. There were eight cases and two deaths. The outbreak was confined to the one household. All cases were isolated as much as possible. All rooms were disinfected by burning sulphur. Funerals were private, direct from house to grave. Premises were placarded and pamphlets on the restriction of measles were distributed among the neighbors of those sick. All cases could be traced to infection from other cases; but the outbreak, although a malignant one, was restricted to the one family.

Outbreak of Measles in Marshall City, Calhoun County.

I. W. Houston, M. D., health officer of Marshall city, wrote to the Secretary of this Board, June 11, 1894, as follows, relative to an outbreak of measles in that city, which outbreak was restricted to the one case:—

"A case of measles developed here yesterday in a traveling man. Room in hotel has been closed and disinfected; patient removed to building at least 100 feet from any other. Have good nurse, and the patient feels better this morning. Will advise you again tomorrow as to his condition."

Dr. Houston wrote to this Office again, Aug. 24, as follows:—

"Yours regarding case of measles received. I am not in receipt of your blank marked 'K,' so had nothing to make a final report on; the case recovered however, and went on its way rejoicing. No other cases followed."

In his final report of the case, Dr. Houston states that it was isolated from all persons except the nurse and physician. The patient was taken out of the hotel and placed in an unused coal office, 100 feet from any other building. Rooms were all disinfected by burning sulphur. Discharges from the patient were disinfected with chloride of lime and then buried. No other cases occurred.

Outbreak of Measles in Petoskey village, Emmet County.

A. G. Oven, M. D, health officer of Petoskey village, in the final report of an outbreak of measles in his jurisdiction stated as follows relative to the source of the outbreak and the methods used to restrict the same: The disease was brought from Grand Rapids by Miss ————, a

professional nurse who came to Petoskey to take care of Mrs. ———, who was sick at the Cushman House. Four cases occurred in the hotel. The cases were isolated in separate rooms, the doors placarded "Measles," and admission refused to all persons except nurse and physician. The health officer knew of no exceptions to the complete accomplishment of measures of isolation and disinfection. No other cases occurred in the village.

Restricted Outbreak of Measles in Chesaning township, Saginaw county.

D. W. Mudge, M. D., health officer of Chesaning township, sent to this office July 17, 1894, the final report of an outbreak of measles in his jurisdiction, in which there had been 10 cases, and in which measures of restriction were taken with good results. Relative to this outbreak Dr. Mudge stated substantially as follows: One source of infection was a child brought from Owosso just as she was coming down with the disease. Patients were all isolated as closely as possible. All rooms where cases occurred were disinfected. Printed directions, published by the State Board of Health, for disinfecting premises, were distributed to the infected households, and the people afterward said they had disinfected as directed before allowing the children to enter school. Sulphur fumes were used in disinfecting rooms, clothing, bedding, etc. Houses were placarded. The outbreak was restricted to ten cases.

Detroit Board of Health decides to Placard and Isolate cases of Measles.

Joseph Schulte, M. D., Acting Health Officer of the city of Detroit, wrote to the Secretary of this Board, Oct. 4, 1894, relative to action taken by the Detroit Board of Health for the restriction of Measles, as follows:—

"The Board of Health of this city has decided at its last meeting to placard and quarantine for measles. The placard will stay up seven days. This new rule will go into effect on or about the middle of the month, and we will furnish you weekly with statistical data on the disease."

In reply to Dr. Schulte's letter the Secretary of this Board stated relative to measles, as follows:—

"Accept my cordial thanks for your letter of Aug. 4, informing me of the action of your Board with reference to measles. This Office will be glad to have the weekly reports."

Outbreak of Measles in the Village of Luther, Lake County, traced to an Infected Person at a Revival Meeting.

February 2, 1894, the following letter was sent by the Secretary of this Board to Dr. E. Fairbanks, health officer of the village of Luther, Lake county, asking for information relative to an outbreak of measles in his jurisdiction:—

"Dear Sir:—Complaint reaches this office that the public schools are stopped, yet the teacher is permitted to have classes at his residence; the Methodist meetings are stopped, and other denominations permitted to hold meetings. It is alleged that all this is done on account of measles. Your reports to this office show that there is no case of measles now present in Luther. It has occurred to me that perhaps the closing of meetings, etc., was because of scarlet fever. Will you have the kindness to explain why they are closed?

"In your outbreak report of Jan. 17, relative to measles, you say—'The disease was brought from outside, by S. Avery.' In your weekly report on blank 'M,' for the week ending Jan. 20, you say—'The person herein reported '*taken sick*' contracted measles, brought by Crusaders, who are holding revivals.'

"I would be pleased to learn the name of the person or persons who brought the contagium of the disease into your jurisdiction, and the name of the *place* where they came from."

In response to the above-quoted letter Dr. Fairbanks wrote to this office, Feb. 3, as follows:—

"The measles was brought to Luther by E. Peck of a Crusade Band. He held revival meetings at the M. E. Church. He came down while at church. He was quarantined; the rest of the crusaders kept on with the meetings until the first of the week. Others who had been at church and were exposed kept coming down, and I promptly shut down the school and church. That was on Monday of this week; that was their last night of meeting; they then gave out that they would hold meetings at a school house in the country close by. I forbade that and then they were going to hold meetings in private houses and I forbade that. They and some of the Methodists claim that they did more good to the soul, than the measles would do harm, and they did not think they had to be quarantined for measles.

"There has been no church held since I closed the meetings, by any denomination; anything to the contrary is false. I refer you to the President of the village, H. N. Hammond; Clerk, Fred Bernen; Supervisor, John Hanrehan. The measles are in ten families in the village and in the township, all of whom are quarantined. As to the teacher holding meetings—he had a few, who had had measles, recite in one study at his house a couple of times before I knew of it, and stopped it.

"The protest sent you is the work of some persons who are systematically working against quarantine for any disease, and they do not stop at telling anything, regardless of the truth.

"I mean business with them, and am supported by the best class of citizens and intend while health officer to hold them down."

The Secretary of this Board wrote, Feb. 5, in answer to the above-quoted letter, as follows:—

"Dear Sir:—Accept thanks for your letter of Feb. 3, relative to measles, and for your weekly report on blank 'M' for the week ending Feb. 3, relative to measles and scarlet fever in the village, and for the outbreak report relative to measles in Ellsworth township.

"I am pleased to learn of your vigorous action to prevent the farther spread of the disease. As a rule this Board does not recommend the closing of the schools, etc., when dangerous communicable diseases are present in the locality, but does recommend that all sick or infected persons be strictly isolated so long as there is danger of their communicating the disease to other persons. However, you are upon the ground and can judge best what should be done to protect the people of your locality. And from what you say, I can see that this is not an ordinary case."

ESTIMATED NUMBER OF OUTBREAKS AND CASES OF MEASLES PREVENTED AND LIVES SAVED BY ISOLATION AND DISINFECTION.

Tables 9 and 10 and the following diagram compare the average numbers of cases and deaths in outbreaks of measles where the measures of isolation and disinfection, prescribed by the Michigan State Board of Health, were enforced, with the average numbers of cases and deaths in those outbreaks where these measures were neglected.* By Table 10 it may be seen that during the five years, 1890-94, there were about 27 times as many cases per outbreak in those outbreaks in which these measures were neglected as in those outbreaks in which they were enforced; and that while there were five-tenths of one death per outbreak where restrictive measures were neglected, no deaths occurred where those measures were enforced.

By Table 9 it may be seen that during the year 1894 there were reported to the office of the State Board of Health 358 outbreaks of measles with

* Foot-note on page 363.

7,345 cases and 49 deaths. Had no efforts at restriction been made, and had the average numbers of cases and deaths per outbreak remained the same as in the column headed "Isolation and Disinfection both Neglected," there would have occurred 15,194 cases, and taking from these the cases (7,345) which did occur, leaves 7,849 cases indicated as prevented in these 358 outbreaks, by isolation and disinfection. By the same method for each year the indicated saving in the 1,762 outbreaks which occurred during the five years, 1890-94, is 71,124 cases and 552 lives. This is shown in Table 10.

AGES OF GREATEST PREVALANCE OF, AND MORTALITY FROM MEASLES.*

The reports of local health officers in Michigan, for the year 1894, stated the ages of 4,807 persons who were sick with measles, and of 20 persons who died of that disease. Table 13 represents, in certain age-groups, the numbers of cases and of deaths from measles; the per cent that the cases in each group were of all cases; the per cent that the deaths in each group were of the cases in that group; the per cent that the deaths in each group were of all deaths; and the per cent that the deaths in special groups were of all deaths,—compiled from all reports for the year 1894, which stated the ages.

By Table 13 it may be seen that the greatest proportion of cases of measles was of children under 11 years of age, 75.1 per cent of all cases having occurred in that age-period; that 21.3 per cent of cases were of persons from 10 to 25 years of age; and 3.9 per cent were of persons over 25 years of age.

In 1894 the greatest proportion of deaths from measles was reported to have occurred in children under 6 years of age, 45 per cent of all deaths having occurred in that age period; 65 per cent of all deaths were of children under 11 years of age; 35 per cent of all deaths were of persons of 10 to 30 years of age, and there were no deaths from measles in persons reported over 30 years of age.

* In compiling data relating to ages, used in tables in this article, where the ages are stated, as they usually are, in full years, the cases, or deaths, are compiled under the years mentioned. When the ages are stated in months, or years and months the following method is pursued:—Persons under one year and six months old are classed as aged *one* year. Those over one year and six months and under two years and six months are classed as aged *two* years. Those over two years and six months and under three years and six months are classed as three years of age, and so on for each year.

In dividing the ages into five-year periods, the first period consists of all ages from birth to five years and six months. The second five-year period includes all ages over five years and six months and under ten years and six months. The third five-year period includes all ages over ten years and six months and under fifteen years and six months; and in each succeeding period the same arrangement is followed.

* Foot-note to pages 362, 364, and 368:

* *Definition of Outbreak.*—For studying the influence of isolation and disinfection in restricting outbreaks of communicable disease, an outbreak is considered as, the existence of one or more cases of a particular communicable disease within any health officer's jurisdiction, whether city, village, or township. All cases of the disease occuring within the jurisdiction during the outbreak are considered as part of the outbreak, unless the contagium cannot be traced to cases within the jurisdiction, and can be traced to cases outside of the jurisdiction, in which instance they are considered as constituting a separate outbreak. When a period of over 60 days has elapsed since the last case (in a given jurisdiction) died or recovered, the outbreak is considered as ended,—unless new cases occur the contagium of which can be traced back to the preceding cases, in which instance the latter cases are considered as part of the same outbreak.

In the compilation of the reports for Tables 9 and 10 and the diagram showing the results obtained by isolation and disinfection, every effort has been made to place the numbers of cases and deaths in each outbreak in the proper columns. If, for instance, there were only one or two cases in an outbreak and the health officer neglected to isolate or disinfect, but for some reason the disease spread no further, the number of cases and deaths were placed in the column headed "Isolation and Disinfection both Neglected." If, on the other hand, as often occurs, quite a number of persons are exposed at the same time and place outside the health officer's jurisdiction, and by proper isolation and disinfection he succeeds in confining the disease to the original cases exposed, they are placed in the column headed, "Isolation and Disinfection Enforced." If, however, he neglects to properly isolate or disinfect, the whole number of these cases and deaths are placed in the "neglected" column. It is to be regretted that many of the reports received at this office do not state exactly what was done to restrict the disease, or are not sufficiently definite to enable the compilers to decide just what was done, and they are obliged to place all such in the column headed "Isolation or Disinfection or both not mentioned, or statements doubtful."

TABLE 9.—*Measles in Michigan in 1894: Exhibiting the Average Numbers of Cases and Deaths per Outbreak:—(1) In all the 358 outbreaks reported; (2) in the 246 outbreaks in which it is doubtful whether or not Disinfection or Isolation was enforced; (3) in the 1 outbreaks in which Disinfection was enforced and Isolation was doubtful; (4) in the 11 outbreaks in which Isolation was enforced and Disinfection was doubtful; (5) in the 10 outbreaks in which Isolation was enforced and Disinfection was neglected; (6) in the 7 outbreaks in which Disinfection was enforced and Isolation was neglected; (7) in the 70 outbreaks in which both Isolation and Disinfection were neglected; (8) in the 13 outbreaks in which both Isolation and Disinfection were enforced.*

	(1) All outbreaks. (358 outbreaks.*)		(2) Isolation or Disinfection or both not mentioned, or statements doubtful. (246 outbreaks.)		(3) Disinfection enforced—Isolation doubtful. (1 outbreak.)		(4) Isolation enforced—Disinfection doubtful. (11 outbreaks.)		(5) Isolation enforced—Disinfection neglected. (10 outbreaks.)		(6) Disinfection enforced—Isolation neglected.† (7 outbreaks.)		(7) Isolation and Disinfection neglected. (70 outbreaks.)		(8) Isolation and Disinfection enforced. (13 outbreaks.)	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals	7,345	49	4,190	42	4	0	92	0	19	0	37	0	2,971	7	33	0
Averages..	20.52	.14	17.03	.17	4	0	8.36	0	1.90	0	5.29	0	42.44	0.10	2.46	0

* Cases and deaths in Grand Rapids are not included in this table, because of the difficulty in determining the beginning and ending of the outbreak. The outbreak in that city in the year 1894 was a continuation of an outbreak in 1893 and extended into 1895.

† A definition of the term "outbreak," and facts relative to methods of compilation of outbreaks, are printed in foot-note on page 363 of this Report.

TABLE 10.—*Exhibiting for the five years, and for each of the five years, 1890–94, the numbers of Reported Outbreaks, Cases and Deaths; also for this five-year Period, the average numbers of Cases and Deaths per Outbreak in all outbreaks; in those Outbreaks in which Isolation or Disinfection or both were Doubtful; Isolation and Disinfection both Neglected; Isolation and Disinfection both Enforced; and, also, the Numbers of Cases and Deaths Indicated as having been prevented by Isolation and Disinfection.*

Years.	All Outbreaks.*			Isolation or Disinfection, or both, not Mentioned, or Statements Doubtful.			Isolation *and* Disinfection Neglected.			Isolation and Disinfection Enforced.			Cases and Deaths Indicated as having been Prevented by Isolation and Disinfection.†	
	Outbreaks.	Cases.	Deaths.	Outbreaks.	Cases.	Deaths.	Outbreaks.	Cases.	Deaths.	Outbreaks.	Cases.	Deaths.	Cases.	Deaths.
1890	419	11,189	103	353	6,326	59	57	4,819	44	6	19	0	24,233	220
1891	392	12,338	118	309	6,492	59	71	5,920	63	11	27	0	20,347	231
1892	236	4,406	67	187	2,427	45	31	1,953	22	7	8	0	10,462	101
1893	357	5,440	71	238	2,569	53	70	2,681	14	10	24	0	8,233	0
1894	358	7,345	49	246	4,190	42	70	2,971	7	13	32	0	7,849	0
Totals	1,762	40,718	408	1,333	22,004	258	299	18,344	150	47	110	0	71,124	552
Averages	352	8,144	82	267	4,401	52	60	3,669	30	9	22	0	14,225	110
Average cases and deaths per outbreak, 1890–94		23.1	.2		16.5	.2		61.4	.5		2.3	0		

* For the years 1890-93 inclusive, outbreaks in Detroit and Grand Rapids are not included. For the year 1894 the outbreak in Grand Rapids is not included, because of the difficulty of determining the beginning and ending of the outbreak. The outbreak in that city in the year 1894 was a continuation of an outbreak in 1893 and extended into the year 1895.

† The numbers of cases and deaths in this double column are found by multiplying "all outbreaks" for each year by the average number of cases or deaths per outbreak, in those outbreaks in which isolation and disinfection were both neglected, for that year, and deducting from the results thus obtained, the cases or deaths, as the case may be, which were *reported* to have occurred that year, to learn the numbers that would have occurred if efforts for the restriction of the disease had not been made. The instances in which isolation and disinfection were enforced are still so few that the evidence is not yet very satisfactory.

Isolation and Disinfection Restrict Measles.

Measles in Michigan in 1894:- Exhibiting the average numbers of cases and deaths per outbreak:- in all outbreaks in which Isolation and Disinfection were both Neglected; and in all outbreaks in which both were Enforced. (Compiled in the office of the Secretary of the State Board of Health, from reports made by local Health Officers.)

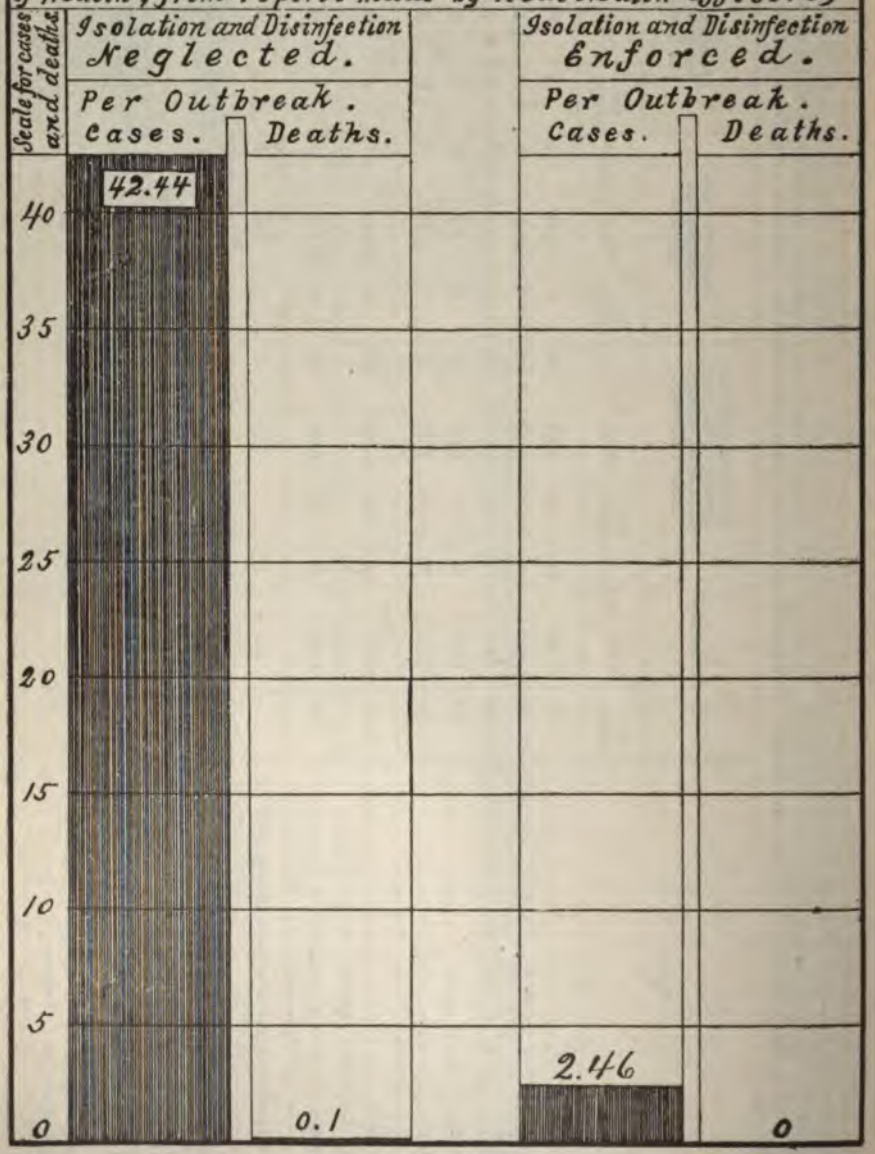


PLATE 844.

PERIOD OF INCUBATION, IN MEASLES.

TABLE 11.—*Exhibiting the reported Period of Incubation, stated in days, in 50 instances of Measles. Compiled from reports of Health Officers in Michigan, for the year 1894.*

Incubation period—days.....	5	6	7	8	9	10	12	13	14	15	16	20	21	22	23
Cases in each period	*1	†2	‡3	2	§12	¶8	‖5	3	**6	2	1	1	2	1	1

* In 1 instance it was reported as *about* 5 days.
† In 1 instance it was reported as *about* 6 days.
‡ In 3 instances it was reported as *about* 7 days.
§ In 4 instances it was reported as *about* 9 days.
¶ In 4 instances it was reported as *about* 10 days.
‖ In 2 instances it was reported as *about* 12 days.
** In one instance it was reported as *about* 14 days.

The average of the above 50 reported periods of incubation is about 11.6 days.

TABLE 12.—*Exhibiting, relative to 40 instances of Measles in Michigan in 1894, the Reported Period of Incubation, within certain limits, stated in days; also the Means, the Average of which may Represent the Average Period of Incubation.*

Days.	Means.	Days.	Means.	Days.	Means.	Days.	Means.
2 to 3	2.5	7 to 10	8.5	9 to 11	10	10 to 15	12.5
2 to 6	4	7 to 10	8.5	9 to 12	10.5	10 to 18	14
2 to 14	8	7 to 14	10.5	9 to 14	11.5	10 to 20	15
4 to 5	4.5	7 to 14	10.5	10 to 11	10.5	11 to 14	12.5
4 to 12	8	7 to 14	10.5	10 to 12	11	12 to 14	13
5 to 10	7.5	7 to 15	11	10 to 12	11	12 to 14	13
5 to 11	8	7 to 18	12.5	10 to 12	11	12 to 14	13
6 to 22	14	8 to 9	8.5	10 to 14	12	12 to 14	13
7 to 9	8	8 to 10	9	10 to 14	12	12 to 14	13
7 to 9	8	8 to 12	10	10 to 14	12	18 to 20	19

The average of all the means, for the 40 instances is 10.5 days.

Table 14 exhibits the numbers of cases and deaths, in which the ages were stated; the per cent the cases in each age-group were of all cases, and the per cent the deaths in each age-group were of all deaths in the three years and in each of the three years, 1892–4.

There are two erroneous and very harmful beliefs, quite prevalent among parents,—that measles cannot ultimately be escaped any more than teething, and that the least dangerous time for persons to have the disease is while quite young children. Whatever ground there may be for these beliefs elsewhere, Table 9 and the diagram illustrative of it, and Tables 13 and 14 and the diagram illustrating Table 14, of this article show that none exists in Michigan; but that on the contrary, facts here bear evidence that measles is a preventable disease; and that it is *more* fatal to children under ten years of age than to older persons.

TABLE 13.—*Exhibiting in certain Age-groups, the number of cases and the number of deaths from Measles; the per cent that the cases in each group were of all cases of known ages; the per cent that the deaths in each group were of all deaths at known ages; and the per cent that the deaths in each group were of the cases in that group.—Compiled from all reports for the year 1894 which stated the ages.*

	Number and per cent of Cases and Deaths in certain Age-groups.*																		
Ages in groups of years.	All ages known.	0-1.	1-2.	2-3.	3-4.	4-5.	0-5.	5-10.	10-15.	15-20.	20-25.	25-30.	30-35.	35-40.	40-45.	45-50.	50-55.	55-60.	Over 60.
No. of cases.....	† 4,807	273	273	284	367	421	1,618	1,988	613	264	143	75	46	28	14	15	1	0	2
Per cent the cases in each group were of all cases of known ages..	100	5.7	5.7	5.9	7.6	8.8	33.7	41.4	12.8	5.5	3.0	1.6	1.0	.6	.3	.3	.02	0	.04
No. of deaths.....	† 20	5	2	1	1	0	9	4	1	2	2	2	0	0	0	0	0	0	0
Per cent the deaths in each group were of cases in that group....	.4	1.8	.7	.4	.3	0	.6	.2	.2	.8	.1	.3	0	0	0	0	0	0	0
Per cent the deaths in each group were of all deaths at known ages	100	25	10	5	5	0	45	20	5	10	10	10	0	0	0	0	0	0	0
Per cent the deaths in special groups were of all deaths at known ages				45			65.			35					0				

* For method of compiling ages refer to first foot-note on page 363.
† Does not include those cases or deaths where the age was not stated.

TABLE 14.—*Exhibiting in certain Age-Groups, the number of Cases and the number of Deaths from Measles, in the three years and in each of the three years 1892-94; the per cent that the Cases in each group were of All Cases; the per cent that the Deaths in each group were of all Deaths.—Compiled from all reports for the years, 1892-94, which stated the ages.*

Year.		Total No. included.	Per Cent of Cases and Deaths in certain Age-groups.*													
			All Ages.	0 to 5.	5 to 10.	10 to 15.	15 to 20.	20 to 25.	25 to 30.	30 to 35.	35 to 40.	40 to 45.	45 to 50.	50 to 55	55 to 60.	60 years and over.
1892.	Cases.....	786	100	28.5	30.0	18.6	12.7	3.9	2.9	1.7	1.0	0.3	0.1	0	0.1	0.1
	Deaths	34	100	41.2	44.1	5.9	0	2.9	2.9	0	0	0	0	0	2.9	0
1893.	Cases.....	3,064	100	32.5	35.1	12.0	9.3	4.5	3.0	2.1	0.9	0.6	0.2	0.2	0.07	0.07
	Deaths	22	100	41.0	13.6	9.1	4.5	4.5	9.1	9.1	0	4.5	0	0	0	4.5
1894.	Cases.....	4,807	100	33.7	41.4	12.8	5.5	3.0	1.6	1.0	.6	.3	.3	.02	0	.04
	Deaths	20	100	45.0	20.0	5.0	10.0	10.0	10.0	0	0	0	0	0	0	0
1892-94.	Cases.....	8,657	100	32.8	38.1	12.8	7.5	3.6	2.2	1.4	0.7	0.4	0.2	0.07	0.03	0.06
	Deaths	76	100	42.1	29.0	6.6	4.0	5.3	6.6	2.6	0	1.3	0	0	1.3	1.3

* *On a preceding page, a footnote to the sub-head under which Table 14 appears, explains these age-groups.*

On page 342 of the Annual Report of this Board for the year 1894 is given a diagram which graphically represents the figures in a table similar to Table 14; showing for the two years, 1892–93, the per cent of deaths which occurred in each age-period.

TABLE 15.—*Exhibiting, by Sex, the per cent of persons in certain Age-groups who recovered from Measles, in Michigan, during the years 1893–94; also the average age and the number of cases included. (Compiled from such reports as stated the ages.)*

Year.	Sex.	Average age of persons who recovered. Years.	No. of cases included.	Age, in Periods of Years. Per Cent of (non-fatal) Cases in each Period.*													
				All Ages.	5 years and under.	5 to 10.	10 to 15.	15 to 20.	20 to 25.	25 to 30.	30 to 35.	35 to 40.	40 to 45.	45 to 50.	50 to 55.	55 to 60.	60 years and over.
1893.	Males	10.28	1,448	100	31.3	37.2	10.3	8.4	5.7	3.3	2.1	1.0	.5	.1	.07	0	.07
	Females ..	10.22	1,596	100	33.5	33.6	12.5	10.2	3.4	2.8	2.1	.9	.6	.2	.3	.1	.06
1894.	Males	8.49	2,424	100	33.9	43.2	12.1	4 8	2.9	1.3	.7	.5	.3	.3	0	0	0
	Females ..	9.04	2,363	100	33.4	39.7	13.5	6.1	3.0	1.7	1.3	.7	.3	.3	.04	0	.08
1893-'94.	Males	9.39	3,870	100	32.9	40.9	11.4	6.1	4.0	2.0	1.2	.7	.4	.3	.03	0	.03
	Females ..	9.63	3,959	100	33.4	37.2	13.1	7.8	3.2	2.1	1.6	.8	.4	.3	.1	.05	.05

* On a preceding page, a foot-note to the sub-head under which this table appears, explains these age-groups.

Table 15 shows that of the 3,870 males reported to have recovered from measles in the years 1893–94 of which the ages were stated, 40.9 per cent occurred in the age-period from 5 to 10 years, and 32.9 per cent occurred in children of 5 years and under, 11.4 per cent occurred in the period from 10 to 15 years and from this age-period the per cent greatly decreased.

TABLE 16.—*Exhibiting, by Sex, the per cent of persons in certain Age-groups who died of Measles during the year 1894.*

Year.	Sex.	Average age of deceased ents. Years.	No. of cases included.	Per Cent of Deaths in certain Age-groups.*										
				All Ages.	Under 5.	5 to 10.	10 to 15.	15 to 20.	20 to 25.	25 to 30.	30 to 35.	35 to 40.	40 to 45.	45 Years and over.
1893.	Males	11.2	10	100	60	10.	0	10	0	10	0	0	10	0
	Females ..	19.2	12	100	25	16.7	16.7	0	8.3	8.3	16.7	0	0	8.3
1894.	Males	10.4	11	100	36	18	9	18	18	0	0	0	0	0
	Females ..	9.7	9	100	56	22	0	0	0	22	0	0	0	0

* On a preceding page, a foot-note to the sub-head under which this table appears, explains these age-groups.

Of the 3,959 females reported to have recovered from measles in the years 1893–94, of which the ages were stated, 33.4 per cent occurred in the first age-period, and 37.2 in the age-period from 5 to 10 years. In the age-period from 10 to 15 the per cent of cases was 13.1, and from this age period the per cent of cases greatly decreased.

TABLE 17.—*Exhibiting, by Sex, for each year of Age, and in certain Age-groups, the number of persons who died from Measles during the year 1894, and the per cent the deaths in each Age-group were of deaths at all ages. (Compiled from such reports to the State Board of Health, as stated the sex and age.)*

Sex.	Ages in Years, and groups of Years.	All ages.	Number and per cent of Deaths by Sex, in certain Age-periods.*																							
			0-5.					5-10.					10-15.					15-20.					20-30.			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	24	29	30
Males.	No. of Deaths, by single Years.		3	1	--	--	--	--	--	1	--	1	--	1	--	--	--	1	--	1	--	--	1	1	--	--
	No. of Deaths, by Groups of Years	11	4					2					1					2					2			
	Per cent the Deaths in each age-group were of the total deaths † among Males	100	36					18					9					18					18			
	Average age at Death, from Measles	10.4																								
Females.	No. of Deaths, by single Years.		2	1	1	1	--	--	--	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1
	No. of Deaths, by Groups of Years	9	5					2					0					0					2			
	Per cent the Deaths in each age-group were of the total deaths † among Females	100	56					22					0					0					22			
	Average age at Death, from Measles	9.7																								
Both Sexes.	No. of Deaths, by single Years.		5	2	1	1	--	--	--	2	1	1	--	1	--	--	--	1	--	1	--	--	1	1	1	1
	No. of Deaths, by Groups of Years	20	9					4					1					2					4			
	Per ct. the Deaths in each age-group were of the total deaths † in both sexes	100	45					20					5					10					20			
	Average age at Death, from Measles	10.1																								

* On a preceding page, a footnote to the sub-head under which this table appears, explains these age groups.

† Deaths from measles.

Table 16 shows that of the 11 males reported to have died from measles in 1894, of which the ages were given, 36 per cent died before reaching the sixth year of age, 18 per cent died in the age-period from 5 to 10 years, 9 per cent in the age-period from 10 to 15 years, 18 per cent in each of the age-periods, 15 to 20 years, and 20 to 25 years. Of the 9 females so reported, 56 per cent died before the sixth year of age, 22 per cent died in each of the age-periods from 5 to 10 years and from 25 to 30 years.

The average age of non-fatal cases was 9.39 years for males and 9.63 years for females.

The average age at death from measles in 1894 was 10.4 years for males, 9.7 years for females, and 10.1 years for both sexes.

Table 17 exhibits the numbers of males and females who died from measles in the year 1894, of which the ages were stated, in each year of age up to 30 years, the per cent of deaths in certain age-periods, and the average age at death of each sex and of both sexes.

AVERAGE DURATION OF MEASLES.—FATAL AND NON-FATAL CASES.

TABLE 18.—*Exhibiting by Sex of patient, the duration (in days) of fatal cases of sickness from Measles, in Michigan during the years 1893-94. Arranged in five-day groups. (Compiled from those reports which stated the length of time the patient was sick.)*

Fatal cases of Measles.									
Year.	Sex.	No. of cases included.	Duration of Sickness:—Per cent of Deaths in each Period of Days.						
			All cases.	0 to 5.	5 to 10.	10 to 15.	15 to 20.	20 to 25.	25 to 30.
1893.	Males	9	100	44.4	22.2	22.2	11.1	0	0
	Females	11	100	9.1	27.2	27.2	18.1	9.1	9.1
1894.	Males	9	100	33.3	33.3	11.1	11.1	11.1	0
	Females	6	100	33.3	33.3	16.6	16.6	0	0

Table 18 shows that of the 9 males reported to have died from measles in the year 1894, of which the interval between the day of being taken sick and the day of death was given, 33.3 per cent died before the sixth day of sickness, and 77.7 per cent died before the sixteenth day of sickness.

Of the females so reported 33.3 died before the sixth day of sickness, and 83.2 per cent died before the sixteenth day of sickness.

The average duration of fatal cases of measles in 1894 was 9.4 days for males, 9 days for females, and 9.2 days for both sexes.

Table 19 shows that of the 823 males who recovered from measles in 1894, of which the interval between the day of being taken sick and the day of recovery was stated, 5 per cent recovered before the sixth day of sickness, 46.8 per cent were sick from 5 to 10 days, 23.6 per cent were sick from 10 to 15 days and 24.7 per cent recovered after the fifteenth day of sickness.

Of the 771 females reported sick in the same time, 7.1 per cent recovered before the sixth day of sickness, 45.4 per cent were sick from 5 to 10 days, 24.9 per cent were sick from 10 to 15 days and 22.6 per cent recovered after the fifteenth day of sickness.

The average duration of non-fatal cases of measles in 1894, was 11.4 days for males, 10.4 days for females, and 10.9 days for both sexes.

TABLE 19.—*Exhibiting by Sex of patient, by per cent of cases which recovered in specified periods of time, the duration (in days) of Non-fatal cases of sickness from Measles in Michigan, during the years 1893-94. Arranged in five-day groups. (Compiled from those reports which stated the length of time the patient was sick.)*

Non-Fatal Cases of Measles.															
Year.	Sex.	No. of cases included.	Duration of Sickness:—Per Cent of Cases in each Period of Days.												
			All Periods.	0 to 5 days.	5 to 10.	10 to 15.	15 to 20.	20 to 25.	25 to 30.	30 to 35.	35 to 40.	40 to 45.	45 to 50.	50 to 55.	55 days and over.
1893.	Males.....	620	100	12.1	45.0	25.3	9.7	2.5	1.6	1.0	1.0	.2	.2	.3	.3
	Females...	654	100	13.9	49.7	22.2	7.5	2.8	1.9	.2	.9	.3	.5	0	.2
1894.	Males.....	823	100	5.0	46.8	23.6	17.4	4.9	.6	.4	.4	.2	.2	.2	.4
	Females..	771	100	7.1	45.4	24.9	16.6	4.4	.3	.7	.0	.1	.5	.0	.0

PROPORTION OF MEASLES IN THE DIFFERENT MONTHS OF THE YEAR 1894.

Table 20 exhibits evidence, from two sources, on the proportion of measles reported in each month of the year 1894, namely the sickness statistics and the contagious-disease statistics. The *first* line states the per cent of all weekly postal-card *reports*, made by physicians in active general practice, which reported the presence of measles under their observation. The *second* line states the average per cent of all these *reporters* who stated the presence of measles. The *third* line states the average order of prevalence of measles in the list of diseases reported. The *fourth* line represents the *prevalence* of measles, according to the sickness statistics, being a combination of the first and third lines of this table (the method of combining them is explained on pages 122-3 of the Annual Report of this Board for the year 1890). In this fourth line the smallest numbers indicate the greatest prevalence,—for instance, May is 1 or *first* in prevalence,—more measles in May than in any other month; April is 2 or *second* in prevalence; June is 3 or *third* in prevalence; and so on. The *fifth* line represents by months the number of outbreaks of measles reported to this office by health officers and clerks, including only the reports which gave the dates of outbreaks,—reports of 53 outbreaks did not give dates and, of course, those outbreaks could not be included in this line.

The evidence of the sickness statistics, summarized in the fourth line of this table (20) indicates that the maximum prevalence of measles in Michigan in 1894 occurred in May, and the minimum in September, whereas the fifth line of the table, which is based on the contagious-dis-

ease statistics, indicates that the maximum number of reported outbreaks occurred in April and the minimum in September. This evidence is only for a single year, and might, therefore, be exceptional. In Exhibit XX., page 137, of this Annual Report for 1895, is a statement of the average per cent of weekly card reports stating the presence of measles by months for the seventeen years, 1877–93, from which it appears that the maximum occurs in May, and the minimum in October.

TABLE 20.—*Measles in Michigan during the year 1894, exhibiting, by months, the per cent of all weekly card-reports received which stated the presence of measles; the average per cent of all observers reporting weekly who reported measles; the average order of prevalence of measles where it was present; the prevalence of measles, according to the sickness statistics, and the number of outbreaks of measles reported by health officers and clerks of local boards of health.*

1894.	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Per cent of weekly card reports stating presence of measles.	6	2	5	9	15	19	13	5	2	1	0.4	1	2
Average per cent of observers who reported measles present	11	6	10	15	26	32	21	11	6	2	1	3	4
Average order of prevalence where present	2.8	3.7	2.1	2.8	2.5	2.7	2.2	3.2	3.6	5.0	1.0	2.8	5.0
Prevalence*	7	11	6	4	2	1	3	8	10	13	5	9	12
Outbreaks†	306	19	22	42	71	63	46	9	7	4	5	7	11

*According to the sickness statistics, as explained in the text accompanying this table. In the fourth line of figures in this table, the smallest numbers indicate the greatest prevalence.

†The numbers in this line show the numbers of outbreaks which *began* in each month. There were 53 reported outbreaks in this year the dates of which were not given.

AN ALLEGED CASE OF TYPHUS FEVER IN MICHIGAN IN 1894.

During the year ending December 31, 1894, one case of suspected typhus fever near Gobleville, Van Buren Co., was reported by Dr. C. W. Huff, Health Officer of Gobleville. The correspondence relative thereto was as follows :—

June 29, Dr. C. W. Huff telegraphed as follows to Secretary Baker :—

"We have case suspected typhus fever. Father died in Atlanta, Georgia. Body shipped here, marked typhoid, but friends say disease was typhus. Symptoms resemble typhus. Send expert if you think best."

Secretary Baker immediately telegraphed Dr. Huff as follows :—

"Cannot find expert tonight; may tomorrow. Best enforce absolute isolation of all infected. Disinfect thoroughly. Keep me informed."

An hour later, Secretary Baker telegraphed Dr. Huff the following :—

"Wire me father's name and date of death in Atlanta."

June 30, in answer to the last message, Dr. Huff telegraphed as follows :—

"G. E. Mentgen, Atlanta, Ga., June seventeen."

On the same date, Dr. Huff also wrote the Secretary as follows:—

"The little child supposed to have typhus came here from Atlanta. Her father contracted the disease in Charleston, S. C. Was taken sick and died at Atlanta. His body brought here for burial marked Typhoid Fever as cause of death. The symptoms point to typhus very much. In haste."

June 30, Secretary Baker sent letter of instruction to Dr. Huff, also documents containing information as to the best methods of prevention and restriction of Typhoid Fever. Secretary Baker also telegraphed "Health Officer," Atlanta, Ga., as follows:—

"G. E. Mentgen died in Atlanta June seventeen. Shipped to Michigan as typhoid. Child here apparently has typhus. Kindly investigate and report."

July 1, Thomas E. Veal, Chief Sanitary Inspector of Atlanta, telegraphed in reply as follows:

"More the form of typhus, contracted in Chicago. Will write particulars."

On July 3, Mr. Veal wrote as follows:—

"Mr. G. E. Mentger died in this city June 17th, 1894. He had only been residing in Atlanta a short time and is said to have contracted the disease from which he died in Chicago, Ill. For all particulars, I refer you to Dr. J. F. Beck, 977, Marietta St., Atlanta, Ga."

July 5, Secretary Baker wrote to Dr. J. F. Beck, as follows:—

"The corpse of Mr. G. E. Mentger, who died in Atlanta, June 17, 1894, was shipped to Gobleville, Michigan, in a box marked 'Typhoid'. A child of Mr. Mentger has since contracted a disease which is reported to this office as typhus, and is supposed to have been contracted from the corpse of her father.

"Will you kindly write me what information you can with reference to the cause of death of Mr. Mentger, his sickness, and where it is probable he contracted his sickness? and also any other facts you may have bearing on the subject. On what date did he leave Chicago? Can you inform me the street and number, or hotel in Chicago where he was."

July 5, Secretary Baker also wrote to Dr. Huff advising him of the facts received from Mr. Veal and continuing said as follows:—

"I have written a doctor in Atlanta who was probably the attending physician, for further information, and will inform you when I hear from him. But I presume no more information will be obtained from there. Please inform me as soon as practicable the (1) sex and (2) age of child of G. E. Mentger, who is sick in Gobleville, and (3) whether this child was with its father in Atlanta, and (4) whether it was with him in Chicago, also (5) just where Mr. M. was in Chicago—hotel, or street and number, and (6) when he was in Chicago."

July 5, Secretary Baker also wrote Mr. Veal as follows:—

"Referring to corpse of Mr. G. E. Mentger, alleged to have died of typhus, will you have the kindness to inform me whether the disease has been spread in Atlanta, and what measures have been taken for its restriction?"

July 6, Dr. Huff replied as follows to the Secretary's letter of inquiry:—

"In reply to your letter of inquiry, would say Mr. G. E. Mentger died in Atlanta June 17 from what the physicians, Drs. Green and some other one not remembered now, said was typhus fever. His little daughter, aged 6, the one now sick, was in the room to see her papa a day or two before he died. The little girl was taken sick June 25 after arriving here. A Mr. Frank Nash* took care of Mr. Mentger in Atlanta, and is now sick with what is reported here as typhus or typhoid fever.

"I do not think Mr. Mentger was in Chicago, but in Charleston, S. C., a few days before he was taken sick. I am not certain, but I do not think the child accompanied her father to Charleston. His wife did, however, and she and another child are now here. No further cases so far. Quarantine not very strict."

Secretary Baker replied to Dr. Huff, July 9, as follows:—

"Accept thanks for your letter of July 6, relative to the outbreak of suspected typhus fever.

"I note what you say relative to Mr. Frank Nash, now of Hastings, being reported sick with 'typhus or typhoid fever', and I will write at once to the Health Officer of Hastings, Dr. M. C. Woodmansee, relative to the subject.

"I wish you would inform me as soon as practicable just what are the signs and symptoms present in the Mentzer child sick with typhus or typhoid fever.

"Have you changed your opinion that it is a case of typhus? If not why do you not enforce the law—Act 137, Laws of 1883, and order complete isolation, as I advised you by telegraph?"

Under the same date, Secretary Baker wrote Dr. M. C. Woodmansee, as follows:—

"It is alleged that a 'Mr. Frank Nash', a resident of your city is sick with 'typhus or typhoid fever', and I would be pleased to hear from you relative to the subject.

"A Mr. G. E. Mentzer died in Atlanta, Georgia, June 17, from what the physicians there diagnosed as typhus fever. His body was shipped to Gobleville, Van Buren Co., for burial. The certificate, which accompanied the remains from Atlanta to Gobleville, gave the cause of the death as typhoid fever. A child, which was with Mr. Mentzer a day or two before he died, is now ill at Gobleville with suspected typhus fever. It was taken sick about ten days after exposure to father.

"I am informed that Mr. Nash, mentioned above, nursed Mr. Mentzer, in Atlanta.

"I would be pleased to hear from you *by return mail*, and if the disease is typhus, by telegraph.

"If disease is typhus fever, complete isolation of the patients and nurses should be ordered and maintained by you under Act 137, Laws of 1883."

*"Frank Nash is in Hastings, Michigan. Now Mr. Mentger and Nashes moved from Hastings to Atlanta about a year ago."

July 11, Mr. Veal replied to Secretary Baker's letter of July 5 as follows:—

"Mr. G. E. Mentzer has been the only death reported from typhus fever up to date, and there is no spread of the disease at all in this city; in fact there are no other cases."

July 26, Dr. Huff answered Secretary Baker's letter of July 9 as follows:—

"In regard to the Mentzer child, I would say that I based my diagnosis on the history and symptoms of the case. The child had been exposed to a case of typhus fever, her father, about ten days before she came down with the disease. There was a rapid rise of temperature on the first day of the fever to 104 2-5. This had been preceded by two days of Malaise. The fever remained at that point with scarcely any remission for 4 days, when it dropped to 101 with corresponding improvement in the symptoms, and continued until the 12th day with slight variations when it left her and did not return. Her convalescence was rapid from that on. She had the eruption laid down by DaCosta, Pepper and others. No other case developed although the isolation was not rigidly imposed. She was in a large, well ventilated room, but attendants mingled with the family which was large, and some members of the family were out and in the room, which I will say was contrary to my instructions. I was not the health officer of the town; the case being outside of the village, and as we looked for some one to come to definitely settle the diagnosis. The Health officer of township did go to see the case one day, and thinking you might send some one, and so things drifted somewhat. Happily no harm came of it.

"The usual placard was displayed, and people informed of the probable nature of the disease and danger, and aside from the immediate family there could come no danger."

July 27, Secretary Baker replied as follows:—

"Accept thanks for your letter of July 26, relative to the case of typhus fever. I enclose herewith a blank "O" and ask you to have the kindness to make a final report of the outbreak. I trust that you will do this, because your letter before me is the first information which I have had that the case was not in your jurisdiction, and I think you can make a more complete report than the health officer of Bloomingdale township. You do not state in what township the case was."

WHOOPING-COUGH IN MICHIGAN IN 1894.

During the year ending Dec. 31, 1894, 4,555 cases of sickness and 123 deaths from whooping-cough in Michigan, were reported to the Secretary of the State Board of Health. The disease was reported to have been present in 241 localities with an average of 18.9 cases and .51 of one death, per locality. The death-rate from this disease for the State in 1894, according to reports, was .55 of one death per 10,000 inhabitants.

The sources of contagion were reported as follows:—In 38 instances as "imported",* in 8 instances as from "contagion", in 7 instances as "epidemic", in 4 instances as from a "previous case", in 3 instances each as from "personal contact", and "contracted at school", in 2 instances as from "exposure", in 1 instance as from "communication", in 48 instances as "unknown", and in 127 instances no statement was made concerning the source of contagion.

TABLE 1.—*Whooping-cough in Michigan for the eight years, 1887-94. Exhibiting the number of reported cases of sickness and deaths and the number of localities in which the presence of the disease was reported, together with the cases and deaths per locality and per 100,000 inhabitants, and the per cent the deaths were of cases. (Compiled from reports received at the Office of the Secretary of the State Board of Health.*

Years.	Cases.	Deaths.	Localities.	Cases per Locality.	Deaths per Locality.	Cases per 100,000 Inhabitants.	Deaths per 100,000 Inhabitants.	Per cent Deaths of Cases.
1887....	2,267	59	162	16.	.36	115	3.	3
1888....	2,502	49	161	15.5	.3	124	2.4	2
1889....	2,694	41	139	19.	.3	131	2.	2
1890....	963	20	93	10.6	.2	47	1.	2
1891....	2,360	101	162	14.6	.6	111	5.	4
1892....	3,188	77	191	16.7	.4	147	3.5	2
1893....	4,047	134	214	18.9	.63	184	6.	3
1894....	4,555	123	241	18.9	.51	203	5.5	3
Av. for 8 yrs...	2,825	76	170	16.3	.41	133	3.6	3

In the foregoing table, it appears that since 1890 the reported sickness from this disease has steadily increased. The increase however is doubtless due to the fact that each succeeding year brings a greater number of more complete and carefully-prepared reports from health officers and clerks.

* This would imply that the disease was brought from some foreign country, but it is probable that the word "imported" was wrongly used and was intended to mean only that the disease was brought from some other place than the one from which it was reported.

Further examination of the table shows that for the last two years, the reported cases and localities have increased in a larger ratio than have the cases per locality, cases per 100,000 inhabitants, and the per cent of cases which proved fatal. Apparently this shows the effect of restrictive measures.

While possibly not half the cases and deaths are reported to this office, greater precautions are now taken against the spread of the contagion than were taken even a year ago. The dissemination, by the State Board of Health, of literature among the people, and the constant instructions by the Secretary of the State Board to local health officers that whooping-cough is a "disease dangerous to public-health," causing as much sickness as measles and more deaths than small-pox, has done a great deal to bring about greater precautions in dealing with sickness from whooping-cough.

SMALL-POX (VARIOLA) IN MICHIGAN IN 1894.

There were reported to the Secretary of the State Board of Health 41 outbreaks of small-pox, in the 36 local jurisdictions, as having occurred in Michigan during the year 1894; and in these outbreaks there were reported to have occurred 285 cases and 60 deaths.

DISTRIBUTION OF SMALL-POX IN 1894.

The following Tables, 1 and 2, exhibit, in different ways, the distribution of the reported small-pox in Michigan, in 1894. Table 1 shows that the sickness-rate from this disease, for the year, for the whole State, was 1.27 cases per 10,000 of population; and that the death-rate per same number of inhabitants, was .27. Table 1 shows also that the greatest sickness-rate from this disease, in 1894, was in Clinton county, where the ratio of cases to population was 6.09 to 10,000. Other counties where the sickness-rates were largely in excess of the average rate for the State, were: Ionia, 5.74; Wayne, 4.92; Washtenaw, 4.60; St. Joseph, 3.99; Oakland, 3.75; Menominee, 2.53, cases per 10,000 of population. The lowest sickness-rate for the year, .21 of one case per 10,000 of population, was in Lenawee county. Other counties whose sickness-rates were much below the average for the State, were: Kent, .33; Kalamazoo, .48; Genesee, .74; Bay, .96 of one case per 10,000 of population. The greatest death-rate from this disease during the year, 1.59 deaths per 10,000 of population, was in St. Joseph county. Other counties where the death-rates were much above the average death-rate for the State, were: Menominee, 1.26; Oakland, 1.17; Clinton, 1.14; and Wayne, 1.13, deaths per 10,000 of population. The lowest death-rate, in counties where deaths occurred, .21 of one death per 10,000 of population, was in Lenawee county, which was the only county whose death-rate was below the death-rate for the State. From the following counties, from which small-pox was reported, Cheboygan, Genesee, Gogebic, Iron, Kalamazoo, Kent, Marquette, Macomb and Washtenaw, no *deaths* from this disease were reported.

The proportionate fatality from small-pox in 1894,—i. e., the proportion of reported cases which proved fatal, was, for the whole State, 21.1 per cent, or about one death to 4.7 cases. The maximum fatality (100 per cent of reported cases) occurred in Lenawee county. Other counties where the fatality was considerably *greater* than the average for the State, were: Menominee, 50; St. Joseph, 40; Bay, Muskegon and Allegan, each, 33.33; Jackson and Monroe each, 28.57, per cent of reported cases. The only counties where the fatality was less than the average for the State were: Ionia, 10, and Clinton, 18.75 per cent of reported cases.

Table 2 exhibits the latitudinal distribution of small-pox throughout the State, by tiers of counties; all the counties of the upper peninsula considered as one tier. By this table (2), it appears that the greatest sickness-rate (3.44 per 10,000 of population) was in the second tier of counties, this having been the only tier in which the sickness-rate was above the sickness-rate for the State. In the city of Detroit, situated in this tier, the sickness-rate from this disease was 6.05 cases per 10,000 of inhabitants.

In this tier, exclusive of Detroit, the sickness-rate is only 1.09 cases per 10,000 of population.

The third tier of counties with 1.17 cases and the fourth tier with 1.14 cases per 10,000 of population are next highest in sickness-rates.

The fifth tier with .12 of one case per 10,000 of population was the lowest in sickness-rate. The seventh tier with .39 of one case, the eleventh tier with .48 of one case, the upper peninsula with .63 of one case, and the first tier with .78 of one case, per 10,000 of population are next in order of lowest sickness-rates.

TABLE 1.—*Numbers of Cases and Deaths reported from Small-pox per 10,000 persons living in each county in Michigan during the year 1894. (Compiled from reports of health officers, clerks, etc.)*

Counties.	Population of Michigan for 1894.*	Number of reported		Number per 10,000 population, of		Counties.	Population of Michigan for 1894.*	Number of reported		Number per 10,000 population, of	
		Cases.	Deaths.	Cases.	Deaths.			Cases.	Deaths.	Cases.	Deaths.
State	2,241,454	285	60	1.27	.27	Kent	121,919	4	0	.33	0
						Lenawee	48,541	1	1	.21	.21
Allegan	39,185	6	2	1.53	.51	Macomb	32,382	5	0	1.54	0
Bay	61,292	6	2	.98	.33	Marquette	38,004	4	0	1.05	0
Cheboygan	13,896	2	0	1.44	0	Menominee	23,736	6	3	2.53	1.26
Clinton	26,262	16	3	6.09	1.14	Monroe	33,179	7	2	2.11	.60
Genesee	40,553	3	0	.74	0	Muskegon	37,328	3	1	1.80	.27
Gogebic	14,083	2	0	1.42	0	Oakland	42,668	16	5	3.75	1.17
Ionia	34,817	20	2	5.74	.57	St. Joseph	25,087	10	4	3.99	1.59
Iron	5,298	1	0	1.89	0	Washtenaw	43,491	20	0	4.60	0
Jackson	46,527	7	2	1.50	.43	Wayne	292,495	144	33	4.92	1.13
Kalamazoo	42,055	2	0	.48	0						

* From State Census.

TABLE 2.—*Exhibiting the Population of Michigan for the year 1894, by tiers of counties (Upper Peninsula as one tier); also the number of cases of Small-pox* REPORTED *from each of these divisions for 1894, and the number of cases per 10,000 estimated population of each division.*

Counties in Groups, most Northern ones First.			Population, 1894.*	Reported Cases of 1894.	Reported Cases per 10,000 of Population.
State			2,241,454	285	1.27
Upper Peninsula	Alger. Delta. Schoolcraft. Luce. Houghton. Ontonagon. Gogebic. Baraga.	Marquette. Iron. Menominee. Dickinson. Mackinac. Chippewa. Keweenaw.	206,572	13	.63
Eleventh tier of counties	Manitou. Emmet. Charlevoix.	Cheboygan. Presque Isle.	42,085	2	.48
Tenth tier of counties	Leelanaw. Antrim. Otsego. Montmorency.	Alpena.	46,766	0	0
Ninth tier of counties	Benzie. G'd Traverse. Kalkaska.	Crawford. Oscoda. Alcona.	41,136	0	0
Eighth tier of counties	Manistee. Wexford. Missaukee. Roscommon.	Ogemaw. Iosco.	66,747	0	0
Seventh tier of counties	Mason. Lake. Osceola. Clare.	Gladwin. Bay. Huron. Arenac.	154,145	6	.39
Sixth tier of counties	Oceana. Newaygo. Mecosta. Isabella.	Midland.	91,113	0	0
Fifth tier of counties	Muskegon. Montcalm. Gratiot. Saginaw.	Tuscola. Sanilac.	250,444	3	.12
Fourth tier of counties	Ottawa. Kent. Ionia. Clinton.	Shiawassee. Genesee. Lapeer. St. Clair.	378,642	43	1.14
Third tier of counties	Allegan. Barry. Eaton. Ingham.	Livingston. Oakland. Macomb.	230,670	27	1.17
Second tier of counties	Van Buren. Kalamazoo. Calhoun. Jackson.	Washtenaw. Wayne.	503,096	173	3.44
First tier of counties	Berrien. Cass. St. Joseph. Branch.	Hillsdale. Lenawee. Monroe.	230,086	18	.78

* According to State Census of 1894.

Small-pox in Michigan in 1894 Compared with Previous Years.

The following table (3), shows the numbers of cases of sickness and of deaths from small-pox which have been reported to this office during the eleven years 1884–94; and the number of localities in the State in which this disease has been reported present in each of those years.

TABLE 3.—*Exhibiting for each of the eleven years 1884-94, the number of reported Cases of and Deaths from Small-pox in Michigan; the number of localities where the disease was present, and the per cent of cases which proved fatal. Compiled in the Office of the Secretary of the State Board of Health, from reports made by local health officers.*

Years.	No. of localities.	Cases.	Deaths.	Deaths per 100 Cases.
1884	5	22	3	13.6
1885	9	27	6	22.2
1886	4	24	7	29.3
1887	2	4	0	0.0
1888	11	42	6	14.3
1889	14	57	4	7.0
1890	2	2	0	0.0
1891	3	3	0	0.0
1892	1	1	1	100.0
1893	2	10	3	30.0
1894	26	285	60	21.1
Total eleven years	89	477	90	18.9

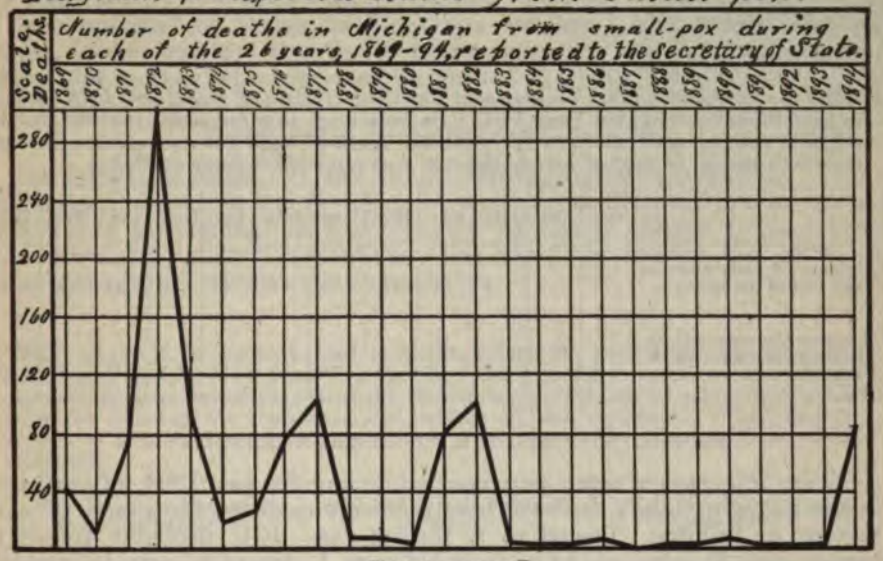
The following table (No. 4), exhibiting the number of deaths from Small-pox, per 10,000 persons living, reported to the Secretary of State, probably more accurately represents the annual fluctuations of, and probably the total deaths from Small-pox in Michigan during the 26 years, 1869–94. The diagram No. 4, Plate 836, graphically represents the same data.

TABLE 4.—*Exhibiting the number of reported deaths from Small-pox per 10,000 persons living in Michigan in each of the 26 years, 1869–94. Compiled from the Secretary of State's Vital Statistics of Michigan.**

Year.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.
Deaths	.38	.08	.61	2.40	.71	.14	.19	.53	.69	.04	.04	.02	.49
Year.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.
Deaths	.58	.03	.02	.02	.03	0	.02	.02	.03	.01	.01	.01	.38

* Twenty-seventh Registration Report (1868) p. 156, and Twenty-eighth Registration Report (1894) p. p. *15 and 246.*

Diagram 4.- Reported deaths from small-pox.



[PLATE 536.]

NUMBER OF OUTBREAKS OF SMALL-POX IN EACH MONTH OF THE YEAR 1894.

TABLE 5.—*Exhibiting the reported number of outbreaks of Small-pox which Began, the number which Ended, and the number of outbreaks which were Present, in each Month of the Year 1894, in the different local jurisdictions of Michigan.*

Outbreaks.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Number began.....	2	2	2	1	5	12	1	0	1	6	6	3	41
Number ended.....	0	1	3	0	4	3	5	7	0	2	3	6	34
Number present.....	2	4	5	3	8	16	13	8	2	8	12	12	93

The last line of figures, in Table 5, representing the reported number of outbreaks present, is not derived from the preceding two lines, as might be supposed, but is obtained by actual count of the number of outbreaks reported as existing in each month. Frequently the beginning of an outbreak is reported but the end of the outbreak is not reported; and sometimes the month in which the outbreak ended is given without giving the date of the beginning of the outbreak. In either case the outbreak may have begun and ended in the same month, or it may have extended through several months. There were 7 more beginnings than endings of outbreaks reported during the year 1894.

The first line of figures, in Table 6, shows the number of cases reported sick in any part of each month.

As some of the cases were sick longer than one month they are included in the cases sick in more than one month, therefore the sum of the cases sick in all the months exceeds the total of reported cases in 1894; and the sum of the last line of figures in Table 6 exceeds 100.

The last line of figures, in this table, shows the per cent the cases sick in each month are of the exact number of cases *reported* to this office for the year 1894.

TABLE 6.—*Exhibiting the Number and Per Cent of cases of Small-pox in Michigan in each Month during the Year 1894. (Includes each case for which the time during which it existed, was stated in the reports. Each of such cases is counted in each month in which, or part of which, the case was reported to have existed.)*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Number of cases sick in any part of the month	4	3	9	13	17	52	59	43	23	64	102	78
Per cent the cases sick in each month were of total reported cases	1	1	3	5	6	18	21	15	8	23	36	27

SOURCE OF CONTAGIUM OF CASES OF SMALL-POX.

Of the 285 cases of small-pox reported during the year 1894, as exhibited in the following table, the local health officers reported the source of contagium as follows: Traced to a former case, 104; probably traced to former case, 2; supposed to be from old rags, 1; traced to outside jurisdictions, 17; probably traced to outside jurisdictions, 5; not reported, 156.

TABLE 7.—*Reported Source of Contagium of Cases of Small-pox in 1894.*

	Cases.
Traced to a former case	104
Probably traced to a former case	2
Supposed to be from old rags	1
Traced to outside jurisdictions	17
Probably traced to outside jurisdictions	5
Not reported	156
All cases	285

Cases of Small-pox Traced to a Preceding Case in the Same Jurisdiction.

The following are extracts from a few of the reports in which the health officers reported the disease traced to a former case in his own jurisdiction:—

In an outbreak of 13 cases of small-pox in Sebewa township, Ionia county, the health officer, C. L. Halladay, reported in reference to 12 of these cases:—

"Did not know what it was until the second person was taken sick, which accounts for the other cases."

Henry Palmer, the health officer of St. Johns village, Clinton county, reported in regard to the 12 cases in an outbreak in that village, as follows:—

"First contagium communicated by an infected person at a hotel to three persons that were sick with small-pox, from which all else came."

In an outbreak of 3 cases in Muskegon city the health officer, Paul A. Quick, M. D., reported that the two cases traced to the first case were the father and mother, who were also the nurses of the patient.

Movements of Contagium of Small-pox.

The following Table (8) and Map, "Movements of Contagium," Plate 847, show the sources and direction of movements of small-pox in Michigan, where the contagium was reported by health officers to have been introduced into their jurisdictions from localities outside the State, or from other jurisdictions within the State.

TABLE 8.—*First, second and third localities, where the second locality was infected with Small-pox from the first, and the third was infected from the second; and the numbers of cases and deaths from Small-pox in the first, second and third localities with the dates of the beginning and ending of each outbreak. (Compiled from reports of health officers who were able to trace the source of contagium to other localities.)*

Number.*	First Localities from which Small-pox was spread.			Second Localities Infected from First.			Third Localities Infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
1	Allegan county: Otsego township..... (Jan. 9-Jan. 11.)	2	1	Allegan county: Otsego village..... (Jan. 25-Mar. 13.)	4	1			
2	Ionia county: Sebewa township..... (Oct. 26-Jan. 12, '95.)	13	1	Ionia county: Danby township..... (Nov. 17-Dec. 18.)	7	1			
				Alpena county: Alpena township.....	†		Cheboygan county: Cheboygan city..... (Oct. 19-Nov. 22.)	2	0
				Kent county: Grand Rapids city... (June 20-Aug. 6.)	1	0			
				Macomb county: Macomb township... (June 16-Aug. 10.)	5	0			
3	Wayne county: Detroit city..... (June 2-Jan., 1895.)	151	34	Monroe county: Berlin township..... (June 19—.)	2	1			
				Frenchtown Twp..... (June 11-Aug. 29.)	5	1			
				Oakland county: Farmington Twp..... (June 18-June 26.)	1	1			
				Royal Oak township. (Nov. 1-Dec. 20.)	11	4			
				Southfield township. (Dec. 30-Feb. 14,'95.)	3	0			
				Washtenaw county: Manchester township (Oct. 8-Nov.)	14	0	Jackson county: Norvell township..... (Oct. 17-Nov. 3.)	1	0

*These consecutive numbers refer to corresponding consecutive numbers preceding paragraphs, further on, which state the details and the names of the health officers reporting the facts.

†Small-pox was not reported to this Office by the health officer of Alpena township, the "second," locality, at the time it was said to have spread from there; the disease, if present, was neglected because not recognised, therefore not reported to the health officer as the law provides. A letter from Dr. Reed, health officer of Cheboygan, printed further on, explains the facts.

TABLE 8.—CONTINUED.—*Movement of infection of Small-pox* Into Michigan *from outside the State.*

Number.*	First Localities from which Small-pox was spread.			Second Localities infected from First.			Third Localities Infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
4	Illinois: Chicago			Bay county: Bay city (May 7–May 23.)	5	1			
				Iron county: Crystal Falls village. (Feb. 17–May 1.)	1	0			
				Kalamazoo county: Kalamazoo city (Mar. 24–May 5.)	2	0			
				Kent county: Grand Rapids city (May 16–July 4.)	1	0			
				Grand Rapids city (June 11–July 12.)	1	0			
				Lenawee county: Adrian city (Nov. 24–Dec. 3.)	1	1			
				Marquette county: Marquette city (May 2–June 15.)	1	0			
				Muskegon county: Muskegon city (June 11–Aug. 29.)	3	1			
5	Indiana: Marion			Jackson county: Rives township (Sept. 15–Oct. 6.)	1	0			
6	Wisconsin: Green Bay			Menominee county: Menominee city (Feb. 20–Mar. 19.)	6	3			
7	Wisconsin: Milwaukee city			Gogebic county: Watersmeet township (Nov. 6–Jan. 1, '95.)	2	0			
				Marquette county: Marquette city (Dec. 8–Dec. 29.)	1	0			

*This footnote is printed at the bottom of the first page of this table.

TABLE 8.—CONTINUED.—**Probable *Movement of infection of Small-pox.***

Number.*	First Localities from which Small-pox was spread.			Second Localities Infected from First.			Third Localities Infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
8	Allegan county: Otsego village	†	----	Allegan county: Otsego township (Jan. 9–Jan. 11.)	2	1			
9	Ionia county: Ionia city	†	----	Ionia county: Sebewa township (Oct. 26–Jan. 12, '95.)	13	1			
10	Shiawassee county: Venice township	†	----	Genesee county: Clayton township (June 29–July 13.)	2	0			
11	Wayne county: Detroit city (June 22–Jan., 1895.)	151	34	Clinton county: Bengal township (Dec. 27–Feb., 1895.)	4	0			
				Oakland county: Pontiac city (July 19–Aug. 24.)	2	0			

TABLE 8.—CONTINUED.—**Probable *Movement of infection of Small-pox* Into Michigan *from outside the State.***

Number.*	First Localities from which Small-pox was spread.			Second Localities Infected from First.			Third Localities Infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
12	Illinois: Chicago	----	----	Jackson county: Jackson city (Apr. 27–May 27.)	4	2			
				Marquette county: Ishpeming city (Mar. 13–Mar. 30.)	2	0			
13	Ohio: Cleveland	----	----	Bay county: Bay City (Harbor) (June 19–July 1.)	1	1			

* This footnote is printed at the bottom of the first page of this table.
† Small-pox was not reported to this Office by the health officer of the "first" locality at the time it was said to have spread from there; showing that the disease, if present, was neglected, probably not reported to the health officer as the law provides.

On the accompanying map, plate 847, the spread of small-pox in Michigan as reported to this office in the year 1894, is shown by black lines which connect the localities; the arrow-head indicates the direction of the movement in each case. The source of this information is given in the list of "extracts of reports of health officers," under the sub-head "Outbreaks Traced to a Former Case Outside the Jurisdiction," with the name and address of each health officer who traced the source of contagium in his jurisdiction to some outside jurisdiction. Tabular statements relating to these instances are in Table 8. In the first column of Table 8, preceding each "First Locality" from which small-pox spread, consecutive numbers refer to corresponding consecutive numbers preceding the paragraphs in the "extracts from reports of health officers," under the following sub-head: "Outbreaks Traced to a Former Case Outside the Jurisdiction."

MOVEMENTS OF CONTACIUM OF SMALL-POX IN 1894.



PLATE 547

Outbreaks Traced to a Former Case Outside the Jurisdiction.

The following are extracts from reports of health officers who were able to trace the outbreaks of small-pox in their respective jurisdictions to cases of the disease outside their jurisdictions,—with the name of the health officer, and of the jurisdiction, subjoined. These quotations concerning the spread of contagium from first to second, from second to third, and even to fourth localities, are arranged in the same order as the "First Localities" in Table 8, thus giving the source of each report:

1. "From previous case in township."—*Milton Chase, M. D., Otsego village, Allegan county.*

2. "From Sebewa township."—*Geo. Culver, Danby township, Ionia county.*

3. "Family was exposed to a case of varioloid in a man from Detroit while they were at Thunder Bay Island, Alpena county. One week thereafter they came to Cheboygan and nine days after were taken sick."—*W. F. Reed, M. D., Cheboygan city,* Cheboygan county.*

3. "Patient had been visiting at several places in Ohio, and on his return stopped at Detroit, and claims to have stopped part of the time at the Merchants' Exchange Hotel."—*W. A. Wilson, Sec'y B. of H., Grand Rapids city, Kent county.*

3. "A young man was attending Commercial college in Detroit. The source was the Merchants' Hotel."—*Carl Juengel, Macomb township, Macomb county.*

3. "Merchants' Hotel, Detroit."—*Theodore Shippee, Berlin township, Monroe county.*

3. "It was contracted in Detroit at the Merchants' Hotel by attending a funeral of a person who died of small-pox."—*Frank Delye, Frenchtown township, Monroe county.*

3. "J—— R—— escaped from the Merchants' Hotel while that place was in quarantine."—*Elliott F. Holcomb, M. D., Farmington township, Oakland county.*

3. "First case of outbreak in Detroit, others contracted from the first and second cases."—*C. Glazier, M. D., Royal Oak township, Oakland county.*

3. "M—— went to Detroit and visited a family who had small-pox, came home and exposed the family."—*S. D. Holcomb, M. D., Southfield township, Oakland county.*

3. "Contracted in Detroit."—*C. F. Kapp, M. D., Manchester township, Washtenaw county.*

3. "Exposed to a case of small-pox in Manchester township fourteen days before eruption in case reported."—*D. Hyndman, Norvell township,* Jackson county.*

Movement of Infection from Outside the State.

4. "Chicago."—*J. W. Caughlin, Bay City, Bay county.*

4. "The person came here from the small-pox district in Chicago and taught about ten days in the public school."—*A. M. Darling, M. D., Crystal Falls village, Iron county.*

4. "First person, a boot-black, worked in Chicago and contracted the disease there."—*Adolph Hochstein, M.D., Kalamazoo city, Kalamazoo county.*

4. "Came from Chicago to attend case in Circuit Court."—*W. A. Wilson, M. D., Grand Rapids city, Kent county.*

4. "Newsboy on C. W. M. R. R. between this city and Chicago."—*W. A. Wilson, M. D., Grand Rapids city, Kent county.*

4. "The patient came here from Chicago on Nov. 21, broke out Nov. 24 in hotel."—*F. E. Andrews, M. D., Adrian city, Lenawee county.*

4. "Eruption appeared two days after leaving Chicago on steamer, 'Peerless'."—*F. Harkin, M. D., Marquette city, Marquette county.*

4. "First case came from Chicago."—*Paul A. Quick, M. D., Muskegon city, Muskegon county.*

5. "From Marion, Indiana."—*Wesley D. Smith, Rives township, Jackson county.*

6. "The girl came to Menominee from Green Bay while afflicted with small-pox, thereby exposing, directly or indirectly, all those afflicted with the disease in this outbreak."—*H. L. Rosenberry, M. D., Menominee city, Menominee county.*

7. "Brought from Milwaukee by same person who carried it to Marquette patient."—*H. C. Hubbard, M. D., Watersmeet township, Gogebic county.*

7. "Man slept with a small-pox patient who was just coming down in Milwaukee."—*F. Harkin, M. D., Marquette city, Marquette county.*

* Third locality infected from the second.

Probable Movement of Infection of Small-pox within the State.

8. "From the paper side of rag-room in paper mill."—*Milton Chase, M. D., (health officer of Otsego Vil.), Otsego township, Allegan county.*

9. "Supposed to have been contracted at Ionia, Oct. 12, 1894, by attending the McKinley meeting at Ionia on that date."—*C. L. Halladay, Sebewa township, Ionia county.*

10. "Supposed caught at Lennon, [Venice Tp.,] Mich., from a tramp."—*A. B. Clark, M. D., Clayton township, Genesee county.*

11. "Had been home a week from Detroit where he had been taking treatment for a cancer. He does not know where he was exposed."—*John Brown, Bengal township, Clinton county.*

11. "J——H—— went to Detroit on the Fourth of July."—*N. B. Colvin, M. D., Pontiac city, Oakland county.*

Probable Movement of Infection of Small-pox from without the State.

12. "Supposed to have been carried in the clothing of a lady visiting from Chicago, or that the lady was suffering from a mild form of varioloid."—*Z. W. Waldron, M. D., Jackson city, Jackson county.*

12. "Brought by two tramps, probably from Chicago, at least from some point in Illinois."—*Geo. G. Barnett, M. D., Ishpeming city, Marquette county.*

13. "Patient was in Cleveland, Ohio, previous to arrival in Bay City, where he shipped on the tug, 'Ella M. Smith."—*J. W. Caughlin, M. D., Bay City, Bay county.*

PERIOD OF INCUBATION IN SMALL-POX.

TABLE 9.—*Exhibiting the reported Period of Incubation, stated in days, in 15 cases of Small-pox. Compiled from reports of health officers in Michigan, for the year 1894.*

Incubation period—Days	10	12	14	16	40
Cases in each period	2	3	*7	2	1

* In one of these cases it was reported as 14 days or over.

The average of the above 15 reported periods of incubation is about 15 days; the greatest number of instances given in any single period was in the fourteen-days period.

TABLE 10.—*Exhibiting, relative to 8 instances of Small-pox in Michigan in 1894, the Reported Period of Incubation within certain limits, stated in days; also the Means, the average of which may represent the average Period of Incubation.*

Days.	Means.	Days.	Means.	Days.	Means.	Days.	Means.
8 to 14	11.	10 to 14	12	11 to 14	12.5	13 to 14	13.5
9 to 12	10.5	11 to 13	12	11 to 18	14.5	15 to 16	15.5

The average of all the means, for the 8 instances, is 12.7 days.

AGES OF GREATEST PREVALENCE OF, AND MORTALITY FROM SMALL-POX.

The reports of local health officers in Michigan, for the year 1894, gave the ages of 105 persons who were sick with small-pox, and of 23 persons who died of that disease. Table 11 represents, in certain age-groups, the numbers of cases and of deaths from small-pox; the per cent that the cases in each group were of all cases; the per cent that the deaths in each group were of the cases in that group; the per cent that the deaths in each group were of all deaths; and the per cent that the deaths in special groups were of all deaths—compiled from all reports for the year 1894 which stated the ages.

By this table (11) it may be seen that the greatest proportion of cases of small-pox was in persons from 15 to 30 years of age, 44.7 per cent of all cases having occurred in that age-period. Under sixteen years of age, 18.1 per cent of cases occurred.

The greatest proportion of deaths, 47.8 per cent of all deaths, also occurred in the period from 15 to 30 years of age; 21.7 per cent of the deaths occurred in children under six years.

The greatest fatality from this disease was in children under six years of age, 55.6 per cent of cases in that age-period, 0 to 5 years, having proved fatal. There were no deaths reported in the age-periods 5 to 10 and 10 to 15 years.

The average age at death from small-pox, in the year 1894, was 29.5 years for males and 22.4 for females.

TABLE 11.—*Exhibiting, in certain Age-Groups, the number of Cases and the number of Deaths from Small-pox; the per cent that the Cases in each group were of All Cases; the per cent that the Deaths in each group were of All Deaths; and the per cent that the Deaths in each group were of the Cases in that group.—Compiled from all reports for the year 1894 which stated the ages.*

	Number and per cent of Cases and Deaths in certain Age-groups.																		
Ages in groups of Years	All Ages.	0–1.	1–2.	2–3.	3–4.	4–5.	0–5.	5–10.	10–15.	15–20.	20–25.	25–30.	30–35.	35–40.	40–45.	45–50.	50–55.	55–60.	Over 60.
No. of cases	*105	4	1	1	1	2	9	6	4	15	15	17	7	5	4	8	0	7	8
Per cent the cases in each group were of all cases.	100	3.8	1.0	1.0	1.0	1.9	8.6	5.7	3.8	14.3	14.3	16.1	6.7	4.8	3.8	7.6	0	6.7	7.6
No. of deaths	23	3	0	1	0	1	5	0	0	4	5	2	1	1	1	2	0	1	1
Per c't the deaths in each group were of cases in that group	100	75.	0	100	0	50.	55.6	0	0	26.7	33.3	11.8	14.3	20.	25.	25.	0	14.3	12.5
Per c't the deaths in each group were of all deaths		13.0	0	4.3	0	4.3	21.7	0	0	17.4	21.7	8.7	4.3	4.3	4.3	8.7	0	4.3	4.3
Per c't the deaths in special groups were of all deaths						21.7			0			47.8			13.			17.4	

* Does not include those cases or deaths where the age was not stated.

AVERAGE DURATION OF SMALL-POX.—FATAL AND NON-FATAL CASES.

TABLE 12.—*Exhibiting by Sex of patient, the duration (in days) of fatal cases of sickness from Small-pox, in Michigan during the year 1894. Arranged in five-day groups, the last days but not the first days in each group are included. (Compiled from those reports which stated the length of time the patient was sick.)*

Fatal cases of Small-pox.										
Year.	Sex.	No. of cases included.	Duration of sickness:—Per cent of Deaths in each Period of days.							
			All cases.	0 to 5.	5 to 10.	10 to 15.	15 to 20.	20 to 25.	25 to 30.	30 to 35.
1894.	Males	15	100	6.7	46.7	40.0	6.7	0	0	0
	Females	12	100	8.3	25.0	41.7	16.7	0	0	8.3

Table 12 shows that of the 15 males reported to have died from small-pox in the year 1894, of which the interval between the day of being taken sick and the day of death was given, 46.7 per cent died after from 5 to 10 days of sickness, and 40 per cent after being sick from 10 to 15 days. Of the females, so reported, 41.7 per cent died after being sick from 10 to 15 days, and 25 per cent after being sick from 5 to 10 days.

The average duration of fatal cases of small-pox in 1894 was 10.6 days for males and 13.6 days for females.

TABLE 13.—*Exhibiting by Sex of patient, by per cent of cases which recovered in specified periods of time, the duration (in days) of Non-fatal cases of sickness from Small-pox in Michigan, during the year 1894. Arranged in five-day groups; the last but not the first days in each group are included. (Compiled from those reports which stated the length of time the patient was sick.)*

Non-Fatal Cases of Small-pox.																
Year.	Sex.	No. of cases included.	Duration of Sickness:—Per Cent of Cases in each Period of Days.													
			All cases.	0 to 5 days.	5 to 10.	10 to 15.	15 to 20.	20 to 25.	25 to 30.	30 to 35.	35 to 40.	40 to 45.	45 to 50.	50 to 55.	55 to 60.	Over 60 days.
1894.	Males	40	100	7.5	7.5	12.5	15.0	10.0	12.5	15.0	0	5.0	7.5	0	5.0	2.5
	Females	23	100	0	21.7	4.4	17.4	26.1	13.0	0	4.4	13.0	0	0	0	0

Table 13 shows that of the 40 males who recovered from small-pox in 1894, 65 per cent were sick from 10 to 35 days. Of the females, so reported, the greatest per cent recovered after being sick from 20 to 25 days.

The average duration of non fatal cases of small-pox, in 1894, was 26.7 days for males and 22 days for females.

A FIRST ATTACK OF SMALL-POX NOT A PREVENTIVE OF A SECOND ATTACK.

In an outbreak of small-pox in the village of St. Johns, Clinton county, which began in Oct., 1894, and resulted in 12 cases and 3 deaths, two of the cases, who acted as nurses, were reported by the health officer, Dr. Henry Palmer, to have refused vaccination on the ground that they had small-pox when children. Both took the disease, and one died.

The following letter was written by Secretary Baker, Dec. 12, 1894, and published in The News, St. Johns:—

"I notice in your paper of yesterday under the head of 'A Serious and Sad Mistake', the account of the death of Julius Garagnon from small-pox, he having been supposed to have had the disease when a small child. It does not seem to be generally known, but it is true, that having had small-pox does not always and probably *does not generally* protect one from small-pox throughout life. Successful vaccination is just as much a protection against small-pox as is small-pox itself. It is generally absolute protection for a time. That time differs in different persons, but it *can not be relied upon more than five years.* Therefore it is important that every nurse or other person exposed to small-pox should be vaccinated promptly, unless they have been *successfully* vaccinated or have had small-pox within five years. Neglect of this is becoming too common in Michigan. Recently at Manchester, Michigan, a nurse for a small-pox patient was not vaccinated because he had had small-pox before. He contracted small-pox again. It is 'a serious and sad mistake' to fail to vaccinate any person who serves as a nurse to a small-pox patient, especially if that person has not had small-pox within ten or fifteen years. As I said before, the State Board of Health does not rely upon it more than five years. Herewith I send you a leaflet containing the recommendation on this subject by the State Board of Health."

OUTBREAKS OF SMALL-POX IN MICHIGAN IN 1894, BY LOCALITIES.

The following are accounts of about one-half of the outbreaks in 1894, in which the facts reported appeared to be of sufficient interest and utility to demand such attention.

Outbreak of Small-pox in Sebewa Township, Ionia County.

The following item appeared in the Detroit News, Nov. 14, 1894:—

"Portland, Mich., Nov. 14.—Three cases of supposed small-pox are reported at Sebewa, Ionia county. One of the patients suspected is Supervisor Charles E. Halladay, who by virtue of his office is executive officer of the township board of health.

"Sebewa people are considerably excited, as Halladay sat on the election board all day Nov. 6. Two other members of his family are down with the same complaint.

"A quarantine has been established on the advice of the attending physician, but a council of physicians will probably be called, and the people hope some other name will be given the disease."

Nov. 15, a report of three cases of small-pox in Sebewa township was received at this office from J. H. McClelland, clerk of that township, who asked Secretary Baker what he would recommend to prevent the spread of this disease.

In reply to this request Secretary Baker wrote, Nov. 15, 1894, as follows:—

"In reply to your—'What have you to recommend so that we may prevent its spread?' I would suggest that the law for the restriction of communicable diseases be strictly complied with; that your board of health publicly recommend general vaccination and revaccination, and offer free vaccination as provided by section 1685, Howell's statutes; that all persons who have been exposed to the disease be vaccinated without delay, with virus known to be active* and kept under surveillance for at least fourteen days from the

* "Four days after vaccination, if it is not then beginning to show signs of being effective, the person should be again vaccinated, and this should be watched and efforts should be made to have the vaccination effective. You should all understand that small-pox is no greater protection than vaccination, so do not rely upon small-pox as a protection if it occurred more than five years ago."

time of last exposure; that complete isolation of all sick and infected persons be ordered and enforced; that (unless your board of health has already done so), your board of health meet and appoint some competent and energetic person to act as health officer, instead of Mr. Halladay, who is ill with the disease. This appointment should be made without delay, and your board should act with vigor.

"I enclose herewith, pamphlets, marked, bearing upon the subject. I also send you by this mail 20 leaflets on the Prevention of Small-pox, and other pamphlets. If you desire more, and can use them to good advantage, I will be pleased to send them. I also send you blanks for reports to this office. Keep me 'constantly informed' relative to the subject.

"P. S.—Your board should at once make and publish 'Rules' in accordance with law."

Nov. 17, the board of health of the township of Sebewa gave notice in regard to vaccination, as recommended by the Secretary of the State Board.

The following telegram from the board of health of a township adjoining Sebewa was received at this office, Nov. 23:—

"Up until to-day board of health of Sebewa have used no precaution against spread of small-pox of which they have twelve cases. Please attend at once. Answer quick."

Nov. 24, Secretary Baker visited the townships of Sebewa, Danby, Sunfield, and Portland, to see whether it was necessary to establish a quarantine under the State law against Sebewa and Danby, in which townships small-pox had also broken out. Secretary Baker advised with the health officials of the townships and villages surrounding Sebewa and Danby, concerning how quarantine could be practically established by the local boards of health under the law which authorizes the local board to make and enforce regulations. He also advised with the acting health officials of Sebewa and Danby.

A letter received at this office, Nov. 27, from a resident physician of Sebewa township, stated that Sebewa was quarantined, and he was unable to procure medicine and vaccine points from Sunfield.

Secretary Baker wrote in reply that the order for medicine and vaccine points should be given to one of the pickets (guards) on the road to Sunfield, one-half mile north of village, and as there were two they ought not to cause delay in filling the order.

Secretary Baker also wrote to the health officer of Sunfield that this should be the order of procedure.

December 19, 1894, C. L. Halladay, health officer of Sebewa, visited the office of the State Board of Health at Lansing, and had a long conference with the Secretary of the Board. A few days later a letter dated Dec. 22, was received at this office from Mr. Halladay:

"I find in looking over my circulars and blanks that there were no blanks for weekly reports put in the envelope when I was at your office last Wednesday. Please send me some.

"You remember my calling your attention to the fact of so many persons who were vaccinated were suffering from running sores on their arms. And since coming home my attention has still further been called to it. From what I have been able to learn more than fifty per cent have suffered seriously. Two are liable to suffer amputation and one lies at the point of death from blood poisoning. And there is a very strong feeling against any further vaccination. Parties whose families have been vaccinated have told me they had rather have the small-pox. We have had two general vaccinations, one twenty-two years ago and one twelve years ago, and had no trouble then. Why is it so this year? I do not feel satisfied with your explanation. Is it possible you may be mistaken? Has *croton oil* anything to do with it? At present it would be almost impossible to get a person to allow themselves to be vaccinated. This is not only so in this township and Danby but Sunfield, and I think all these physicians received their vaccine matter from Detroit."

Secretary Baker replied to the above letter, Dec. 24, as follows:—

"Accept thanks for letter of Dec. 22, relative to small-pox. Croton oil will not cause blood poisoning, but it may make a sore in which all sorts of disease-germs may thrive.

"Experience is a severe, but good teacher. Had the recommendations of this Board been accepted by the local board of health of Sebewa township, and bovine virus been obtained from a *reliable* source, it is possible and I think *very* probable that the vaccinations would have been more satisfactory. No such complaints have been made where the virus we recommended has been used.

"P. S.—The blanks for weekly reports we sent to you by this mail."

Mr. Halladay reported to this Office that he was at Ionia, at the time of the McKinley meeting, and that just fifteen days thereafter, he was taken with small-pox. People from St. Johns, where the disease was present, were at that meeting. That is the only source of contagium which he could give.

In his final report of this outbreak, he stated that they did not know what the disease was until the second person was taken sick, which accounted for the exposures and the other cases.

There were 13 cases and 1 death reported to have occurred in this outbreak.

Outbreak of Small-pox in Danby Township, Ionia County.

The source of contagium of the outbreak of small-pox in Danby township was reported by the health officer, Geo. Culver, to have been from Sebewa township. He reported 7 cases and 1 death, and that there were no conveniences for isolating the patents from the families, but the houses were quarantined and the disease was confined to the three houses in which it first broke out.

Outbreak of Small-pox in Royal Oak Township, Oakland county.

A newspaper item called the attention of this office to a case of small-pox in Royal Oak township, Oakland county. Upon writing to the health officer of that township in regard to this case, an outbreak report was sent to this office, Nov. 8, giving the source of contagium of the case to have been from Detroit. In a letter from the supervisor, N. E. Springsteen, of Royal Oak township, sent in later, it was stated that the patient had peddled potatoes in Detroit and at one place where he stopped they told him they had small-pox.

No further report was received at this office until Nov. 22, when, in answer to another letter from Secretary Baker asking for information in regard to this outbreak, the health officer, Dr. C. Glazier, reported that he did not know of the second case, in the same family, until the patient died. He further reported that he had heard that two more of the family were sick, but improving. In a letter to this office, dated Nov. 23, Dr. Glazier wrote that the house had been placarded.

In reply to a letter from Secretary Baker, Dr. Glazier wrote that the patient taken to the pest-house in Detroit was taken there at the request of the family, that he was taken by night in the pest-house ambulance. Also that there were two more cases in that family.

A resident of this township wrote to Secretary Baker, Dec. 20, asking how long after recovery and after the house, clothing, etc., had been disinfected, should a patient be kept from the public.

Secretary Baker replied, Dec. 21, to the above questions, as follows:—

"In Quain's Dictionary it is stated that—'the patient may be discharged safely when the crusts and scales have disappeared, and not less than six baths have been given, at intervals of two days.'

"P. S.—The law requires the health officer to disinfect. And disinfection should be *thorough* before any are permitted to go out."

There were 12 cases and 4 deaths reported to have occurred in this outbreak, 9 of which were traced to a former case.

Jan. 15, 1896, Dr. T. G. Holmes wrote the following letter to Secretary Baker:—

"I want some one to advise me and believe you can. In November, 1894, I was called by the supervisor (Tp. health officer) of Royal Oak to attend three families having small-pox, and at the Jan. meeting of the Board of Supervisors, at Pontiac, received payment for attendance, except $30.00 reduction in bill. Shortly after, on the 24th of Jan., 1895, the supervisor himself developed small-pox and delegated his position to Dr. Hammond as acting health officer, he, in turn by telephone, summoned me for attendance, also requesting a nurse. The latter I secured and he remained during the sickness. When I went to Royal Oak I saw some members of the Tp. Board and asked who was to pay the expense. Dr. Hammond and Mr. Storrs being present, the latter said, 'Oh, the board will stand by you as before.' I attended Mr. Springsteen (the supervisor), furnishing medicine, sprays and everything, even paying transportation for nurse and clothing for him. No subsequent cases developed. I disinfected. And at the April meeting of Tp. Board at Royal Oak presented bill at same rate as formerly, $10.00 per day and expenses, amounting to $214.50. An election was pending and the supervisor refused to present the small-pox bills until after. Then he was defeated and at a subsequent meeting presented a bill for $124.50 purporting to be the bill I sent in. This was approved by the Board and at the October session of supervisors they deferred action until January. A few days ago I learned they consider 'the county is not liable for Mr. Springsteen's bill.' Now I wish to ask you, is the county liable for attendance to an official who contracts small-pox while in the discharge of his duty? I am actually in need of the money and can not collect a cent from Mr. Springsteen personally. Will you kindly advise me what to do? And how to do it?"

Secretary Baker replied, Jan. 16, 1896, as follows:—

"Replying to your letter of Jan. 15, section 1634 Howell's Statutes gives every board of health power to regulate and audit all fees and charges of persons employed by it in the execution of the health laws and its own regulations.

"Section 1647 Howell's statutes requires the local board of health to make effectual provision in a manner which they shall judge best for the public health and safety for a person sick or infected with a dangerous communicable disease and providing nurses and other assistance and necessaries which shall be at the charge of the person sick, persons or parents who may be liable for the support of the patient, if able; otherwise as a charge of the county to which he or she belongs. The Supreme Court has decided,—3rd Mich., page 475, that when any expense is incurred under this section and chargeable to the county, and the amount has been *fixed by the local board of health*, the Board of Supervisors must allow that amount at once, and provide for its payment. The Board of Supervisors have no discretion further than to ascertain whether the patient or the patient's friends liable for his support, are able. In this case, I understand that the patient is *not* 'able', that is, you cannot collect of him. It may require mandamus from Circuit Court to compel supervisors to allow the bill.

"P. S. Herewith I send you pamphlet marked to call attention to the law and the decisions of the Supreme Court. It seems to me that the decision last mentioned on page 3, bears on your case, although there may be a great difference between a city which has funds to pay out, and a township which has not such funds.

"I shall be glad to be informed later just how this case turns out."

Outbreak of Small-pox in Sturgis Village, St. Joseph County.

Dr. S. B. Follett, health officer of Sturgis village, St. Joseph county, reported, May 15, 1894, a case of small-pox in that village. In a later report he stated that the contagium was from a tramp who called at the water works, of which the patient, L——, was engineer, and remained there

some time. The tramp stated that he had recently had small-pox. The disease was communicated to three other members of the family and to the nurse, who had small-pox when young. Four of the family died. Dr. Follett reported that the house was small so that perfect isolation in the same house was impossible. The house was thoroughly disinfected and the burials were at night by the undertaker and his assistant. The bodies were wrapped in sheets wet in strong zinc solution, placed in the coffins, these again wrapped in sheets wet in zinc solution and then boxed. June 16, Dr. Follett reported another case, which was taken to the pest-house.

The following letter, dated June 26, was received at this office from J. S. Flanders, postmaster of the village of Sturgis:—

"I have been urged by the business men of this city to call upon the State Board of Health to send an expert here to examine whether a case of sickness here is small-pox.

"Dr. ——, who was first called to attend the case, June 18, tells me that the man had no eruptions characteristic of small-pox while he attended him. He was troubled with stomach and bowel difficulty, probably caused by drinking ice water while at work digging post holes on the 16th. Some roughness of the skin was noticed but nothing characteristic of small-pox. Dr. —— called again the 19th and found patient improving; 20th patient was about town much improved. Morning of the 21st patient was about town and it was reported to health officer Follett that he had suspicious eruptions on face. Follett followed him home and took him to the pest-house, pronounced the case small-pox, and the resulting general excitement followed.

"The patient claims to have encountered poison ivy in his work on the 16th and this is confirmed by his employer. He also claims to have been similarly afflicted before, which is confirmed by his father. Dr. Follett, the health officer, is attending him, and on the 23rd, 24th, 25th and today has reported him 'better' each day and the eruption 'drying up.' In view of these circumstances there is good reason for the doubt and claim by many that the case is *not* small-pox and for this reason an official investigation is called for.

"The business interests of Sturgis are being injured several hundred dollars per day, adjacent towns are taking steps to quarantine against us, if they have not already done so; nearly $1,000 have been expended and contracted in preparation for a Fourth of July celebration, and this investigation is called for in justice to all interests.

"If the expense is not chargeable to the expense of your Board or this county it will be paid here and I will be responsible for the same.

"Our papers are all published on Thursday and the investigation is desired before that time and by one whose report will be perfectly impartial, regardless of the personal interest of any physician or individual.

"Please wire me your orders in the matter and when your representative will be here and oblige."

Secretary Baker sent the following telegram in reply, June 28:—

"We have no expert here to diagnose small-pox. But one isolated case, well guarded, in edge of village, should be no hindrance to your celebration. I am advised and believe there is no danger of any person contracting small-pox in Sturgis."

And on June 29, Secretary Baker replied by letter, as follows:—

"Your letter relative to an expert being sent to Sturgis to determine 'officially,' whether a case of sickness in Sturgis is or is not small-pox, has been replied to by telegraph, that there is no regularly-appointed official inspector of contagious diseases in the service of the State Board of Health. Bills have been introduced in the legislature more than once, providing for such inspections, but they have failed to become a law. In cases where the public health is likely to suffer unless, through an inspection, more stringent methods are adopted, this Board has, from time to time, sent one of its members, or more frequently employed outside expert physicians to visit the locality and advise with the local health authorities. In this case at Sturgis, however, there was no claim that the public safety was being endangered, and it seems to me that the telegram which I sent should be sufficient to show people outside of Sturgis that there was no danger of contracting small-pox in Sturgis. I suppose it would cost you from forty to seventy-five dollars to have either of the persons whom this Board has heretofore employed, visit Sturgis

on this business, because, if the case did not turn out to be small-pox, in the opinion of the expert, he would come in conflict with the local health officials; if, in his opinion, it is small-pox, he would have to undergo disinfection and delay in resuming his work again. If, however, you still wish to employ some one, I will designate and refer you to J. J. Mulheron, M. D., 73 High Street, East, Detroit, and if he cannot be procured, Hiram A. Wright, M. D., 393 Grand River Ave., Detroit. These are the only ones this Board has ever employed as experts in the diagnosis of small-pox. I trust, however, that my telegram has served your purpose."

After some correspondence with Dr. Follett relative to the symptoms in this doubtful case, Secretary Baker wrote to him, July 12, as follows:—

"Please accept thanks for your letter of July 11, relative to the symptoms of the cases of small-pox. From your description it would seem that the cases were small-pox.

"You are probably mistaken as regards the communicability of ivy poisoning, because I have myself contracted the disease from another person, and at another time from a coat (which I had worn one year previous) the sleeves of which then caused the disease.

"Relative to your keeping ——, if he is free from infection and wishes to go, I suppose that he must be allowed to be at liberty. Perhaps you may *hire* him to serve as nurse."

Four more cases were reported, the last, July 30, was exposed by going secretly to the pest-house out of curiosity. He was promptly removed to the pest-house before exposing others.

Outbreak of Small-pox in Manchester Township, Washtenaw County.

A case of small-pox in Manchester township, Washtenaw county, was reported to have been taken sick, Sept. 30, 1894, but owing to the slow development of the disease was not pronounced small-pox until Oct. 8. The health officer, Dr. C. F. Kapp, and the township clerk, William Koebbe, reported that all exposed persons were ordered to remain at home, and on Oct. 10 regulations were adopted by the Board of Health, and free vaccination offered. A small-pox hospital was established on the farm of the first patient. Fourteen cases were reported in this outbreak. Correspondence from that place with this Office shows that there was considerable excitement, and the health officer, Dr. Kapp, telegraphed to Secretary Baker to come there to investigate.

The following newspaper item, dated Oct. 30, gives the small-pox situation in Manchester township, at the time the Secretary of the State Board of Health visited that locality; also some of his recommendations for restricting the spread of the disease:—

"A Press reporter called upon Dr. Baker, President of the State Board of Health, on his return last evening from Manchester and Coldwater, where he was called to investigate the cases of small-pox and diphtheria now prevalent in those places. The doctor stated that in all there have been twelve cases of small-pox in the vicinity of Manchester. Two are now sufficiently recovered to be released from quarantine, and all are doing well.

"The disease was brought to that place from Detroit by a person by the name of Hemendinger, who was exposed while visiting the State fair.

"One special reason for the doctor's visit was to investigate a case in the village where eruption had followed vaccination, and the question had arisen whether it was going to prove a case of varioloid or just an extraordinary severe case of vaccination. After a careful diagnosis it was decided to be merely severe vaccination; but the precaution of isolation was taken as a matter of safety.

"The presence of small-pox in the community has emphasized the merits of vaccination, and there are few remaining in all that vicinity who have not taken this precaution against this terrible communicable disease.

"Interest being aroused, the question was asked whether it was necessary to repeat vaccination if, for instance, the operation was successfully performed in infancy, to which the doctor replied:

"'Yes, sir; the power of the operation constantly diminishes and in a few years is outgrown entirely. I myself have been successfully vaccinated five times. It is claimed that certain other diseases, such as typhoid fever, destroy the protective power of the vaccine, and there are many facts sustaining this theory.'"

Small-pox in the city of Cheboygan, Cheboygan county.

An outbreak of small-pox occurred in the city of Cheboygan, in which there were two cases and no deaths from the disease. W. F. Reed, M. D., health officer of the city, wrote to the Secretary of this Board, October 31, 1894, relative to the source of contagium in this outbreak, as follows:—

"I think I have found the solution of the origin of the two cases of small-pox which we have here. Mrs. Sinclair says that her cousin came to Thunder Bay Island fishing; that he reached there on Saturday, and that on the following Wednesday he got up in the morning feeling badly; that during the day a rash appeared on his face and arms; but that said rash was all gone on the following morning or at least during that day; that he felt badly only for thirty-six (36) hours; that he remained on the Island about three weeks and went home last week; that he was well except that 36 hours; that the Wednesday on which the rash appeared was the week before the Tuesday on which they left the Island for here. The boy was taken sick 9 days after they came here or *16* days after the rash on the man on the Island. 36 hours seems to me a very short time for Varioloid but it also seems to me that *that* is where it came from. The man was Geo. Edens, 123 Charlotte Ave., Detroit, Mich."

Small-pox in Otsego village and Otsego township, Allegan county.

An outbreak of small-pox occurred in Otsego township, and Otsego Village, Allegan county; there were 2 cases with 1 death in the township, and 4 cases with 1 death in the village, and the outbreak lasted from Jan. 9, to Mar. 13, 1894. The following report of this outbreak was printed in the "Abstract of Proceedings" of the meeting of the Michigan State Board of Health, held in Lansing, April 13, 1894:—

"In compiling, the outbreak of small-pox in Otsego township would be treated as one outbreak, and the cases in Otsego village would be treated as a separate outbreak; but on account of the intimate relation between the cases, the fact that the cases all originated directly or indirectly from the first case, and for convenience in this quarterly report, I will here treat these cases as belonging to one outbreak. Although diligent efforts have been made, the source of the outbreak is in doubt.

"The *first* person taken sick who is known to have had small-pox was Mr. Burnside, who resided just outside the village in the township of Otsego, and was taken sick Jan. 16. He was employed in the Bardeen Paper Company's mill, where his work necessitated his handling baled rags. No evidence could be obtained that he handled infected rags, unless his sickness from small-pox be considered such evidence. His wife, who was employed in the rag room in the paper mill, was slightly indisposed a few days prior to Mr. Burnside's illness, but it cannot be ascertained with certainty that she had varioloid. Mr. Burnside's illness, when he was first taken sick, was diagnosed as scarlet fever. Burnside was taken ill with supposed scarlet fever January 9, and died on the morning of January 16.

"The *second* case (varioloid) in this outbreak was Dr. Milton Chase, the village health officer, who was called to treat Mr. Burnside. Doctor Chase has recovered. The *third* case was a Mr. Ropp who resided in the village and had been nursing the first case. The *fourth* and *fifth* cases were two elderly people, Mr. and Mrs. Sherwood, residing in the village of Otsego, and at whose house Mr. Ropp boarded. Mr. Sherwood died. The *sixth* was a Mrs. Herrington, who kept a boarding house just outside the village limits. The source of contagium in this case was supposed to be the attending physician who had attended the other patients, and had been treating Mrs. Herrington for some other ailment. Mrs. Herrington

recovered. March 13, a final report was received from the township, and one from the village. No other cases are expected to occur.

"January 30, the Secretary of this Board received a telegram from E. J. Rose, Clerk of the Otsego Board of Health saying "Disagreement as to whether we have small-pox in Otsego or not. Come at once. Answer." In accordance to the foregoing request for an expert, Dr. J. J. Mulheron, of Detroit, was requested to go to Otsego, which he did, and the following is his report:—

"*Detroit, February 2, 1894.*

"*Henry B. Baker, M. D., Secretary State Board of Health, Lansing, Michigan:*

"DEAR DOCTOR:—Pursuant to instructions received from you to proceed to Otsego, Allegan county, to investigate the alleged outbreak of small-pox at that place, I left Detroit by M. C. R. R. on the afternoon of January 31. An accident to the engine of the train at Parma caused a delay which necessitated my remaining at Kalamazoo over night. I reached Otsego at 7:30 A. M. of the 1st inst, and reported at once to Dr. F. W. French, the local health officer. After receiving his statement as to the status of affairs I was driven to the house of D. A. Ropp, which I found placarded for small-pox. After removing my overcoat and donning an oil-cloth ulster I proceeded to make an examination of Mr. Ropp, who was confined to his bed. This examination revealed a case of varioloid, the eruption being in the pustular stage. I found the house and its inmates carefully quarantined as per the regulations prescribed by the Michigan State Board of Health.

"I next visited the residence of Dr. Milton Chase, on the porch of which I noticed two placards and a red flag. One of these placards bore the word "small-pox," and the other, over which floated the red flag, indicated "chicken-pox." I learned that the small-pox placard had been put in place by the local health authorities, and that the chicken-pox sign and the red flag were posted at instance of Dr. Chase, the occupant of the house. I entered unaccompanied and was cordially met by Dr. Chase, to whom I explained the object of my visit. I found that the doctor himself was the patient in regard to whose ailment there existed the difference of opinion indicated by the two placards on the house. I submit herewith the doctor's own typewritten statement regarding his case.

"'On Tuesday, January 23, 1894, I got out of bed after having had several light chills, and slight general pains, during the night. Through the day I had several light chills, slight fever, and a good deal of mental depression.

"'On the 24th, symptoms about the same, but a little increased sense of prostration.

"'On the 25th, about the same, except that I could not sleep during the night, was much depressed, and thought best to keep my bed.

"'Had a restless night on the 26th, but no chills, although a slight fever, and much sense of prostration.

"'On the 27th had a slight chill, and a little fever during the night, slept a little and felt much better. Was about the house during the day. Had two or three small points of some eruption on my forehead appear during the day.

"'On Sunday, 28, feel better than yesterday, slept better during the night, no chills or fever. The irruptive points on my forehead are one celled vesicles.

"'29. Had a better day than yesterday. Vesicles fully developed, and new ones appearing on head, breast and arms.

"'30. First vesicles dried down, some of the newer ones disappearing, and some new ones appearing on left arm and on head.'

"The doctor believed himself to be suffering from varicella. In this diagnosis I did not concur and gave it as my opinion, based on the appearance of the eruption and the age of the patient (about 60 years) that the disease was varioloid. The doctor readily acquiesced and forthwith ordered the chicken-pox card removed.

"*History.* During the late Christmas holidays Mr. Abram Burnside, aged 42, and his wife, both employés of the Bardeen Paper Mills of Otsego, made a trip to Allegan in the same county where they spent one day. The exact date of the visit I could not ascertain. Soon after their return (how soon I could not ascertain) Mrs. Burnside was indisposed for a few days during which a slight eruption of 'pimples' appeared on her body. The nature of the eruption could not be ascertained as the indisposition was not sufficient to cause her to call in medical aid. Shortly after Mr. Burnside sickened, and I submit herewith, the history of the case which was kindly furnished me by Dr. Milton Chase, his medical attendant:

"'*History of the irregular case of Scarlet Fever, that occurred in the village of Otsego, Mich., during the month of Jan., 1894.*

"'On the 9th day of Jan., 1894, Dr. M. Chase was called to see one Abram Burnside, who lives in the northwest part of said village, having no other resident member of his household save his wife.

"'He was an American born Caucasian, aged about 42 years, an employé in the Paper Mill at Otsego village. His business was that of a foreman in the rag room and his duties consisted mainly in getting up bales of rags from the store-room, and opening them up, ready for the assorter's use, and removing them after they had been assorted. He had been in this employment for more than three years, last past.

"'By history he was found to be a man of temperate habits and good hygienic and social habits. His wife was also an employé in the same mill with him, in the rag department. He had had very little sickness during his life, was about 5 ft. 7 in. high, and weighed about 175 pounds. He was of rather a muscular and sanguine temperament.

"'He had not been away from home, save a trip, one day, to Allegan, during the holidays last past, and could not recall that he had seen any one sick with any irruptive skin disease. So much for a preliminary statement.

"'I found him suffering from fever of a moderate degree, and a good deal of general muscular pain. He complained most of pain in his back and head. Tongue, not badly coated, moderate nausea, and no vomiting.

"'On the 11th, I was called to see him again, and I visited him one or more times, each succeeding day, until the 16th, on which day he died.

"'On the 11th, he had very much the same symptoms as at my first visit, to which was added the appearance of a rash upon his face, neck and chest, that presented itself in thickly set spots, about ⅛ of an inch in diameter, that did not feel rough or hard. He had a fine, evenly diffused redness of the tongue and fauces. He had acute inflammation of the tonsils and the papillæ of the tongue were enlarged and protruded through its coating. He complained of a difficulty in swallowing and had very little thirst, or desire for food.

"'On the 12th he was much the same in general conditions as on the 11th, but the rash had extended over his arms and trunk, and down onto his thighs, and on his face and neck it was blended into an even scarlet-colored rash. The rash did not have the feel of papulæ or any sharply defined areas. He had considerable delirium, but could be controlled by the persuasions and advice of his wife. There was also increased difficulty in swallowing. He complained quite a good deal of general itching.

"'On the 13th this rash discolored the entire surface of his body, and looked *too dusky to be called red* but *could not be called black.*

"'On the 14th, about the same general conditions, only in higher grade, extreme restlessness, and the difficulty in swallowing so great that he could not, or would not swallow anything save a little water.

"'Up to this time, his wife had had no assistance in caring for him, but said she could care for him one more night.

"'At no time up to this date had the thermometer registered more than 102°. His pulse was quite soft and had a frequency of 110. He breathed as if he had some bronchial difficulty, respirations 24 a minute. He had slept some during the night and day in short naps, was still delirious but could be controlled by language.

"'During the day sometime, while his wife was temporarily absent at an out house, she found him, upon her return, standing at the pump, clad only in his shirt, pumping water on his feet.

"'On the fifteenth there was a general appearance of great exhaustion. He had not been able to take any of his medicine, and an extremely small amount of water. The color of his face was black, shading down to a dark red on his chest and scarlet on his legs. There was a little tendency to flakey desquamation on his forehead. His respiration was more hurried, pulse softer and about 110. He could answer all questions put to him intelligently, but was still delirious, when left to himself, having short spells of quietness of from 5 to 10 minutes long. There were quite large and flakey scales over his face, ears and neck. This was at morning call. In the evening the conditions were about the same as in the morning, with increased restlessness and less obedience to commands. He had been able to swallow practically nothing during the day, and for the first time during his sickness, assistance was called in (a nurse procured). [This was D. A. Ropp, the man to which I have referred as suffering from varioloid.—J. J. Mulheron.]

"'On the 16th, at morning visit, about 8 A. M., the patient was found in collapse, and soon after died. By history of the case, through the night, I learned that the patient was found able to swallow, along about 11 or 12 o'clock at night. He was extremely restless and irritable during the night. I was at the bedside at the time of his death.

"'There was at no time during the patient's sickness a vesicle or a pustule on his body. I think that during the last night of his sickness, from the history given by the attendant, and the condition presented in the morning, that he had had a tonsillar abscess break during the night.

"'I advised the widow that there should be a speedy burial of the corpse, that it should be wrapped in a disinfected sheet, placed in the coffin, and that the coffin should not be afterwards opened, and that there should be no funeral services at the house, and that only a few of the intimate friends should be allowed to follow it to the grave. That at the grave there should be only a short ceremony. To all this the widow agreed, and it was so done. By her request, I went to the undertaker and told him how we had agreed to dispose of the corpse, and requested that he use all the antiseptic precaution necessary to prevent the contagion going out of the coffin, during the process of burial. This he told me he would do, and afterwards told me, he did do.'

"I am clearly of the opinion that Abram Burnside suffered and died of small-pox, of the hemorrhagic variety, that D. A. Ropp, his nurse, contracted a severe attack of varioloid from his exposure to the case, and that Dr. Milton Chase, his attending physician, escaped with a very mild attack of varioloid.

"I cannot close this report of my investigation without expressing my admiration of the intelligent and energetic action of the local Board of Health in the serious danger which threatened the residents of Otsego and the adjacent country. In the absence of an efficient board of health during the emergency the prevalence of small-pox would unquestionably have been very general. As it is there is good reason to believe that the trouble was stamped out in its very incipiency.

"Very respectfully yours,

"J. J. MULHERON, M. D."

Reports of the outbreaks of small-pox in Crystal Falls, Iron county, in the city of Menominee, in Marquette county, and from Kalamazoo county, were printed in the "Abstract of Proceedings" (pp. 11–15) of the meeting of the Michigan State Board of Health, held in Lansing, April 13, 1894; and below are given extracts therefrom and a special report of the outbreak in the city of Menominee.

"*Small-pox in Crystal Falls, Iron county.*

"The second outbreak of small-pox occurred in Crystal Falls village, in Iron county. The first and only case reported was taken ill Monday, Feb. 19, 1894. The patient was a male school teacher, aged 35 years. He had been indisposed the previous Friday, but taught school that day and the following Monday until noon. Monday afternoon he called upon a physician, and at a conference of the health officer and the attending physician on the following morning it was decided that the patient was suffering from small-pox. Relative to the source of contagium of this outbreak, the health officer, Dr. Darling, writes March 10, as follows:

"'Regarding the case of small-pox in our village, would state that Mr. Williams, who is the victim, was a teacher in our public schools, and was obtained through the S. R. Winchell Teachers' Agency, 382 Wabash ave., Chicago. He had been here about a week when taken sick, and said he did not know as he had been exposed. As soon as I found he had small-pox, I quarantined the house and all the inmates. It has now been 21 days since he 'broke out' and the school board desires to commence school tomorrow. (There were no new cases and the man is getting well.) But I thought better to wait another week as I think the most dangerous time is as desquamation is taking place. I told them I would write you and get your opinion. Please answer by return mail and oblige.

'Yours respectfully,

'A. M. DARLING.

"The following reply was sent to Dr. Darling:

"'DEAR SIR:—Accept thanks for your letter of March 10, relative to small-pox, in your village. The average duration of the infectiousness of small-pox after apparent complete recovery, and with efficient disinfection, is probably six weeks. So long as a patient, who is recovering from the disease, shows any process of desquamation, he should be kept in isolation, and the health officer should be very sure that desquamation has ceased before releasing him, and *that* should not be done until after thorough disinfection of his clothing. Particular attention should be paid to the disinfection of the patient's hair and *beard. He should* also take a bath.

"'As a rule, this Board does *not* advise the closing of schools where dangerous communicable diseases are present, but *does* advise the complete isolation of any person sick *or infected* with such a disease. Also the disinfection of any infected thing or room.'

"The final report of this outbreak at Crystal Falls has not yet been received, but it is inferred that no new cases have occurred, that the patient has recovered and that the outbreak is over.

"*Small-pox in Menominee, Menominee county.*

"The third outbreak was reported by telegraph from Menominee, Feb. 26. The source of contagium was given as 'brought from Fort Howard, Wisconsin.' In this outbreak, to the close of the quarter, there have been reported six cases and two deaths. No new cases or deaths have been reported since the week ending March 17. A notice from the Secretary of the Wisconsin State Board of Health, dated Feb. 14, informed this office that four cases and one death had occurred up to that date, at Fort Howard, Wis. The date of that notice (Feb. 14) antedates the date of the discovery of the first case at Menominee just 12 days. No final report has yet been received relative to this outbreak at Menominee.

"*Small-pox in Marquette County.*

"The fourth outbreak of small-pox occurred at Ishpeming, March 13, 1894. Relative to the source of contagium in this outbreak, Dr. Geo. G. Barnett. the city health officer, writes March 18. 'Patient, with a partner, have been on a tramp from Spring Valley, Ill. They reached here last Tuesday, and one of them, a Mr. Martin Lucas, was taken sick the same night, but neglected to call a physician until last evening. I immediately quarantined the whole family, and this morning vaccinated them all. It is not a severe case, and I trust we may be able to keep it confined to one house. We feel like congratulating ourselves on the fact that we have vaccinated 2,700 people, mostly children, within the past three weeks, and with most excellent success. It is quite probable that he contracted the disease in Chicago, but of course we cannot say positively.'

"In his weekly report for the week ending March 24, the health officer reports one other case, and says, 'Small pox from same source as the first patient, or *from* first patient.' From that it may be inferred that the second case is the 'partner' spoken of. From other sources it is learned that the two men had left Ishpeming some weeks previous, in search of work, and had gone to Spring Valley, Ill., and not being successful there, had gone to the 'drainage canal' near or in Chicago, and from there had returned home to Ishpeming.

"From Jan. 1, 1894, to Feb. 14, 1894, there had occurred in Chicago 259 cases of small-pox, and it is very probable that the disease in this fourth outbreak was contracted in Chicago or its suburbs.

"*Small-pox in Kalamazoo County.*

"The fifth and last outbreak was reported at Kalamazoo city, March 28. Relative to this outbreak Doctor Adolph Hochstein, the city health officer, wrote March 27, as follows:

"'Walter Jackson, aged 15, colored, returned from Chicago two weeks ago today, after staying there one week. Last Saturday morning he took sick, but a physician was not called in until yesterday noon.

This afternoon I was requested by the attending physician, who regarded the case as suspicious, to see the patient with him, and I found a case of confluent small-pox in the papular stage, some vesicles had put in their appearance.

"'The patient is under strict quarantine with two nurses. Five other individuals, who have been exposed, are also under quarantine in another house. Necessary vaccination is being done.

"'A little 13 year old boy, who has been exposed, left yesterday morning for Grand Rapids. I will immediately communicate the facts to the health officer of that city.

"'You will oblige us here by withholding the matter from the press.'*

"Immediately upon the receipt of Dr. Hochstein's letter at this office, a letter was sent to the health officer of the city of Grand Rapids, informing him that an infected person had gone to his city from Kalamazoo. Pamphlets on the restriction and prevention of small-pox were also sent.

"From the foregoing it may be seen that small-pox was present at the close of the quarter in three different localities in the State, and probably four, but it is fair to assume that the outbreak at Crystal Falls is over.

Small-pox Spread from Fort Howard, Wisconsin, to Menominee, Michigan.

Report of an investigation made by the State Board of Health of Wisconsin, relative to an outbreak of small-pox, in the city of Fort Howard, Wis., which spread to Menominee, Mich.:—

WISCONSIN STATE BOARD OF HEALTH,
OFFICE OF THE SECRETARY,
Appleton, Wis., April 17th, 1894.

The State Board of Health having received certain complaints made by the citizens of Fort Howard and Green Bay, that sufficient precautions had not been taken in the management of an outbreak of small-pox which had recently existed in Fort Howard, and that in consequence there had been needless exposure and loss of life in that city; and having received also official complaint, made by the board of health of the city of Menominee, Michigan, that through mismanagement of this outbreak, small-pox had been allowed to enter that city, resulting in several cases of the disease, and the loss of three lives at that place; the State Board of Health of Wisconsin convened in the city of Fort Howard, on Friday, April 6th, 1894, for the investigation of this matter, there being present the following members, to wit: Dr. Solon Marks, the President of the Board; Dr. J. T. Reeve, the Secretary; Dr. U. O. B. Wingate, of Milwaukee; and Dr. J. W. Handcock, of Ellsworth.

There appeared before the Board, Hon. Wm. Larson, Mayor of the city; Dr. F. L. Lewis, the health officer; and the following named gentlemen of the board of health of the city, to wit:—Messrs. M. J. Corbett, C. E. Schultz, P. Hanrihan, James Olliver, J. A. Sorensen, and J. K. Ford, also Mr. and Mrs. Witters, who had been in charge of the sanitarium in which the small-pox cases had been treated, (Mrs. Witters having been at that time the matron of the institution, and Mr. Witters having been at that time a member of the city board of health) Dr. A. W. Slaughter, who had attended all the cases except the original one, and Mr. J. H. Tayler, a member of the city council, who had had exceptional facilities for becoming acquainted with the history of the outbreak.

The result of the investigation as learned from these several parties, showed the following historical facts, and lead the Board to the following conclusions:—

The first case of small-pox occurred in this outbreak in the person of a man who was found sick on the streets of the city on the 23d of January, and taken on the same day to the sanitarium owned and controlled by Dr. Lewis, the health officer, by whom the case was subsequently attended. It was diagnosed as a case of la grippe, for the management of which no isolation seemed at the time to be necessary. Two days later, however, to wit, on the 25th day of January, an eruption appeared on the person of the patient, which in the opinion of the Board should have aroused so much suspicion that the isolation of the patient at that time would have been only a matter of reasonable prudence. The freest communication by means of open doors communicating with the living rooms of the house, and with that of

* "This request was not complied with, because it is contrary to the settled policy of giving the public *the information*, to enable all to coöperate for the general safety."

another patient then in the sanitarium was, however, continued until the 27th, when the case having been diagnosed as small-pox, the room was isolated as thoroughly, perhaps, as was then possible; but the matron does not appear to have been instructed as to the precautions she should have taken, and she continued to act both as nurse for the patient and as manager for the household, until the death of the patient which occurred January 31. There was, up to this time, no placarding, and very slight evidence of any attempt at anything approaching a quarantine of the premises, the confessed purpose being to keep the matter secret from the public if possible, for fear of creating a panic—a policy which the State Board of Health has always condemned as both unwise and wrong. The household had been vaccinated on the 30th, but it was not successful in any instance, and it was not repeated.

On the 6th, of February, it appeared that a young woman who was in the sanitarium at the time the small-pox patient was taken there, and who had the most ample opportunity to be exposed to the disease, was allowed by Dr. Lewis to leave the sanitarium, without any disinfection of person or clothing, and go in the cars to her home in Menominee, Michigan, in which, and very soon after her arrival Dr. H. L. Rosenberry, the health officer of the city, states that she had small-pox, which she communicated to several other persons, to three of whom it proved fatal. It is asserted, and believed, that at the time the young woman was permitted to leave the sanitarium she did not show any appearance of sickness. The evidence presented, however, shows that the possible incubative period of small-pox had not elapsed, and she should have been detained until it had, and she should have then been thoroughly disinfected, both in person and clothing, before being allowed to leave.

On the same day the young woman left the sanitarium, Dr. Slaughter was called to see a member of the matron's family, who had been complaining for a day or two, and found him in the initial stages of small-pox. Other inmates of the sanitarium came down with the same disease in quick succession, among whom two died. This does not include the infant child of Dr. Slaughter, who died in the sanitarium at a later date, having been taken there for treatment after having contracted the disease in his own home.

From these facts, amplified by much corroborating testimony, the State Board of Health finds:

First: That there was gross neglect of such precautions in the management of the first case, and in the control of the young woman who carried the disease to Menominee, as might have confined the disease to the one case, or certainly to those directly exposed to him before a diagnosis of small-pox was made. For such neglect the health officer, Dr. F. L. Lewis, must be regarded as wholly responsible.

Dr. Lewis is further responsible for failure to make prompt report of this outbreak of small-pox to the State Board of Health, which was kept in ignorance of this disease being present in Fort Howard until after the death of the first patient, and the existence of other cases of small-pox in that city had been announced in the public press.

Second: It appears to the Board, however, that the failure of the health officer to perform his duty in this case was indirectly encouraged by the fact that both the board of health and the city council left everything to the health officer, without question, and without knowledge as to whether he was, or was not, acting efficiently in any case. It appears, for instance, that the health officer, who under the charter is to be appointed by the mayor and confirmed by the city council, had in fact never been confirmed, and had never taken the oath of office as health officer; and it further appears that the board of health was only partly organized and had only a nominal existence, and that it was entirely ignorant of its duties and powers. It is evident that such lax methods on the part of the board encouraged equally lax methods on the part of the health officer. This fact, however, cannot be pleaded by Dr. Lewis in excuse, as by the acceptance of the appointment and the performance of some of its duties he was the *de facto* health officer of the city, and as such bound to the performance of its duties whether he received the moral and material support he ought to have received or not.

Third: The evidence shows that the board of health remained inactive trusting all to the health officer, even when some of its members knew of the existence of the first case of small-pox, and when all, probably, knew that a death had occurred from this disease. On the appearance of the second case of small-pox, however, the board acted promptly and commendably, placarding the premises where it existed, and establishing and maintaining a thorough quarantine over them until the final termination of the disease, and the disinfection of the house and its contents. It further appears also that during this time the resignation of the health officer had been requested. The fact that it was not required, and that he still continues to hold the office, can, under all the circumstances, only be regarded as a virtual withdrawal of the request. In the opinion of the State Board of Health the continuance of the health officer in his office has therefore made both the board of health and the city council parties to whatever of discredit the management of the first case has brought upon, and now attaches to the City and the State.

Finally: It is an ungracious task to criticise the acts of public officials; but in fidelity to the trust reposed in it, the State Board of Health believes it to be its duty to state, as it has done, with all possible

plainness, the results of its investigation, to the end that such statement may help to fix the responsibility for the mismanagement of the outbreak where it belongs, and in the hope also that this costly experience may lead to a better appreciation of the duties and responsibilities of all who may hereafter be in any way connected with the public-health service.

The above report having been adopted, it was directed that it be entered on the minutes of the Board, and that copies be sent to his Honor the Mayor of the city of Fort Howard; to the Board of Health of the City of Fort Howard; to Dr. F. L. Lewis, Health Officer of said City; to Dr. H. L. Rosenberry, Health Officer of the City of Menominee, Michigan; and to Dr. H. B. Baker, Secretary of the Michigan State Board of Health, at Lansing, Michigan.

By order of the Wisconsin State Board of Health.

SOLON MARKS, *President.*
J. T. REEVES, *Secretary.*

To Henry B. Baker, M. D., Secy. Mich. State Board of Health, Lansing, Michigan.

SMALL-POX IN DETROIT IN 1894.

The outbreak of small-pox in the city of Detroit is of especial interest on account of the peculiarly misleading combination of measles and small-pox in the first case, and from the unfortunate location of the case in a hotel, where many persons were exposed to the contagium, with the result of an extensive outbreak in the city and the infection of numerous localities throughout Michigan and adjoining States, by persons who contracted the disease while stopping at this hotel.

The first case, a Miss Leonard, was taken sick about the first of June, while acting as a servant in the Merchants' Hotel in Detroit. The attending physician diagnosed the case measles, and strict isolation was not enforced, as it should have been. The patient died, June 6, and a post-mortem examination, by a council of physicians representing the city board of health, revealed the fact that she had small-pox at the time she died. Thorough disinfection and closing of the hotel were enforced at once, but on June 21, Dr. McLeod, health officer of the city, in a telegram to the Secretary of this Board, gave the names of twelve persons having small-pox in the city. From June until the end of the year 1894, there occurred in the city of Detroit 144 cases and 33 deaths from small-pox.

Reports made to this office by local health officers of nine different jurisdictions in Michigan, stated that small-pox infection had been carried into their jurisdictions from Detroit. Five of these nine persons contracted the disease in the Merchants' Hotel.

Chas. N. Hewitt, M. D., Secretary of the Minnesota State Board of Health, in a report sent to the Secretary of this Board, Sept. 1, giving the small-pox situation in his State at that time, attributed the source of contagium of an outbreak in St. Paul to infection from Detroit.

July 7, 1894, C. O. Probst, M. D., Secretary of the Ohio State Board of Health, wrote to the Secretary of this Board, stating that an outbreak of small-pox had occurred in Wood county, Ohio, in the person of a man who had stopped at the Merchants' Hotel, Detroit, on the nights of the 5th and 6th of June. Dr. Probst's letters relative to this case are given below because they are of interest in showing that the Ohio case contracted both measles and small-pox from the case in Detroit:—

"Dear Doctor:—I returned last night from a visit to Luckey, Wood county, this State, where small-pox has recently developed. The patient, Henry McGale, left Lenawee, Lenawee County, Michigan, about June 5th, and stopped on the night of that date and the following night at the Merchants' Hotel, Detroit. He reached Luckey on the 7th, and developed small-pox on the 22nd or 23rd of June. A second case has occurred in a child of the family, (this family recently came from Michigan) with whom McGale was staying.

"I write for information concerning small-pox in the Merchants' Hotel at Detroit, where it is alleged, this man contracted the disease. The papers reported that one or more cases of small-pox had occurred in this hotel, and I should be glad to have the particulars as to dates, etc."

July 9, 1894, the Secretary of this Board wrote as follows, in answer to the above-quoted letter from Dr. Probst:—

"Dear Sir:—Accept thanks for your letter of July 7, relative to small-pox at the Merchants' Hotel in the city of Detroit, conveyed to Luckey, Wood county, Ohio.

"A servant, female, named Leonard, was taken ill at the Merchants' Hotel in the city of Detroit about the 25th of May, and the attending physician diagnosed the disease as measles. The health officer of the city was informed on June 4, that a suspected case of small-pox was at that hotel. He called up the attending physician by telephone, and was answered in reply that the case was one of measles. The patient died in the afternoon or evening of July 6, and the body was removed to Giest Bros.' morgue that night. Thursday morning the health officer was requested to examine the body, which he did, and pronounced the cause of death small-pox. The death certificate given by the attending physician for the burial permit showed that the person had died of measles. Immediate steps were taken to prevent the spread of the disease from the Merchants' Hotel, but numerous of the boarders and guests of the hotel, who had heard rumors that the death was caused by small-pox, became alarmed at the prospect of being isolated in the hotel, and fled, so that the authorities were unable to secure all who had been exposed to the contagium of the disease. Some who escaped went to other places in the city, and could not be traced; others went into the country. Numerous cases in the city of Detroit, and several outbreaks in localities in Michigan, outside of the city, are alleged to have been caused by infection from the hotel named.

"No small-pox has been reported from the county of Lenawee, in this State; and it seems probable that the man, Henry McGale, in Wood county, Ohio, had been infected with the disease at the Merchants' Hotel in Detroit, while there 'about June 5th,' although the period of incubation would seem unusually long, 16, 17 or 18 days.

"I would be pleased to learn the name of the locality in Michigan from which came the family, with which the man McGale was staying, in Wood county, and in which a child is now sick with small-pox.

"So far as I have been able to learn, but the one case occurred at the Merchants' Hotel in Detroit, the others occurred in different parts of the city, and as soon as discovered were removed to a small-pox hospital, or were strictly isolated where discovered. The disease appears to be under control in the city and throughout this State at this time. I am informed by the acting health officer of the city of Detroit that 'quarantine' was removed from 13 infected houses during the past week, and that ten houses yet remain most of which 'will be disposed of during' the present week."

The Secretary of this Board wrote to Dr. C. O. Probst again, July 21, relative to small-pox cases, as follows:—

"Since sending you my last letter relative to the family of James McGinn, residing in Luckey, Ohio, members of which are sick with small-pox, and which removed recently from Lenawee Junction, Lenawee county, Michigan, to Luckey, I have received the following letter from Ed. F. Underwood, the supervisor of Palmyra township, Lenawee county, in which Lenawee Junction is situated.

"'*Henry B. Baker, Secretary Board of Health, Lansing, Mich:*

"'Dear Sir:—In reply to yours of the 13th, in regard to the small-pox affair, I have investigated the matter and find that one James McGinn, Jr., moved from Lenawee Junction, Palmyra township, with his family to Luckey, Ohio, Monday, April 2nd, 1894, all in good health at the time. About June 5th, a young man, whose parents live at Lenawee Junction, visited the McGinns at Luckey, Ohio, and in a few days came down with the measles as the doctors pronounced it, and later had the small-pox, and now three of McGinn's family have the small-pox. This young man or boy left Lenawee Junction some time before going to Luckey, report says went from the Junction to Monroe, from there to Detroit, thence to Monroe and from there to Toledo, Ohio, after which he went to Luckey, O. Rumor says he stopped in Detroit at a place where a woman had died with small-pox, and slept in the same room. Of this I can't vouch for, it might have been Toledo.

"'We have had no case of small-pox here for years.'

"From the above it would seem that the disease was contracted somewhere en route from Lenawee Junction to Luckey.

Very respectfully,

HENRY B. BAKER, Secretary."

July 27, 1894, Dr. Probst wrote to the Secretary of this Board in answer to the above-quoted letter as follows:—

"Dear Doctor:—Please accept thanks for your favor of the 21st instant with a copy of the letter from R. F. Underwood, the supervisor of Elmira [Palmyra] township, Lenawee county, Michigan.

"The fact that the first small-pox patient at Luckey slept in the Merchants' Hotel in Detroit at the time another case of small-pox existed in said hotel seems to indicate without much doubt that this was the origin of the disease. It is a fact that this patient had measles within a week after coming to Luckey, and within another week was taken with small-pox. There were three children in the family in which he was staying, and I saw them when two of them had a well-marked case of measles, while the third had both measles and the eruption of small-pox at one and the same time. This child had a well-marked case of small-pox, and his two brothers have within the last day or two contracted small-pox from him. Two cases of small-pox have just been reported at Cleveland, but I have not yet learned the origin of the disease."

July 30, the Secretary of this Board wrote to Dr. Probst in answer to the above-quoted letter as follows:—

"Accept thanks for your letter of July 27, relative to small-pox at Luckey, in your State, and relative to the manner in which the first patient contracted the disease in Detroit, Michigan. Your letter seems to confirm the allegation that the woman who died with small-pox at the hotel in Detroit, was also infected with measles. This last was claimed by the attending physician."

The information contained in the above-quoted letters was condensed and sent from this office, in the form of a hektographed letter, to the newspapers and health officers, where it was thought that the information might be the means of preventing a mistake in diagnosis and a consequent exposure of many persons to the contagium of small-pox as in the Leonard case in Detroit.

VACCINATION.

During the year 1894 the Secretary of this Board received numerous letters of inquiry from local health officers in Michigan relative to giving free vaccination to persons in their jurisdictions, and many inquiries were made relative to defraying the expense of vaccination. Below are given examples of some of these letters, and answers to the same as sent from this Office:—

May 10, 1894, Dr. M. A. Jerome, health officer of Fairfield township, Lenawee county, wrote to the Secretary of this Board, relative to giving free vaccination to persons in his jurisdiction, as follows:—

"How about offering free vaccination, as there is small-pox in Toledo, Ohio, and I hear there are cases at Jackson, Mich.; is that so?"

The Secretary of this Board answered the above-quoted letter, May 14, as follows:—

"Your letter of May 10, relative to free vaccination, and small-pox at Jackson is before me. Relative to free vaccination I herewith enclose a leaflet bearing upon that subject.

"There are now three cases of small-pox at Jackson, and one case at Bay City.

"This Board recommends that your Board offer free vaccination."

The leaflet mentioned in the above-quoted letter is given below:—

THE PREVENTION OF SMALL-POX.

THE DANGER FROM SMALL-POX IS NOW GREAT.

Now is a Good Time to be Vaccinated.

[195]-Fourth Edition.

To THE HEALTH OFFICER:—Small-pox is usually most prevalent in the winter and spring months (reaching the highest point in May), and it tends to reappear after somewhat regular intervals of time, sometimes five or ten years; thus the maximum deaths from small-pox in Michigan have been reported in 1872, 1877 and 1882. Since 1882 it has not caused many deaths in Michigan.

The rarity of small-pox in Michigan for several years has led to a feeling of security and it is feared, to neglect of vaccination, resulting in an increased proportion of inhabitants, who are not protected by recent vaccination. This might make possible a widespread epidemic, if small-pox should enter the State in such a manner that exposure to it should be general, as is favored by improved facilities for general and rapid travel through and about the State.

The proper preventive of such a calamity is general vaccination and re-vaccination of all persons not recently thus protected. There is no better-settled fact than that vaccination does protect against small-pox. But after a time the protection is weakened, therefore after the lapse of five years there should be re-vaccination.

The law under which general vaccination may be favored by local boards of health, is as follows:

Act No. 146, Laws of 1879, entitled, "An act to authorize boards of health of cities, villages, and townships to furnish vaccination to the inhabitants thereof."

SECTION 1. *The People of the State of Michigan enact*, That the board of health of each city, village and township may, at any time, direct its health officer or health physician to offer vaccination, with bovine vaccine virus, to every child not previously vaccinated, and to all other persons who have not been vaccinated within the preceding five years, without cost to the persons [person] vaccinated, but at the expense of such city, village or township, as the case may be.—§1685 Howell's Statutes.

At a special meeting of the State Board of Health, Lansing, May 3, 1894, preambles and resolutions were adopted, as follows:—

Whereas, Small-pox is widespread in the United States, prevalent in Chicago, and present in four places in Michigan, and

Whereas, By reason of the recent neglect of vaccination and re-vaccination it may be still more prevalent,

Resolved, That the State Board of Health recommends to each and every local board of health in Michigan, that it offer free vaccination with bovine virus, under act 146, laws of 1879; also that each local board should recommend general vaccination, and re-vaccination of all persons not successfully vaccinated within five years.

Bovine vaccine virus is propagated and sold by Dr. Charles N. Hewitt, Secretary State Board of Health, Red Wing, Minnesota; also by Dr. H. A. Martin & Son, Roxbury Station, Boston, Mass. Virus is for sale by most druggists. The virus should be fresh. This State Board of Health does not compete with druggists in supplying vaccine virus.

From January 1, 1894, to the present time, May 9, 1894, small-pox has been reported from States (and neighboring Provinces) as follows: Province of Ontario: eight cases in two localities, all recovered. Province of New Brunswick: One case at Sussex. Connecticut: 26 cases in six localities. Illinois: 1,225 cases in 14 localities, 1,210 cases at Chicago. Indiana: 24 cases in 7 localities. Louisiana: Small-pox at New Orleans. Maine: One case at Bangor. Michigan: 21 cases, including five deaths, in 8 localities. Massachusetts: 47 cases since September 21, 1893. Maryland: Five cases now at Baltimore. Minnesota: Six cases in two localities. New Hampshire: One case at Portsmouth. New York: 123 cases; New York City 43, Brooklyn 60, and 20 cases throughout the State. North Carolina: One case at Wadesboro. Ohio: 19 cases in 9 localities. Pennsylvania: 792 cases in 23 localities, 719 cases at Reading, since outbreak in February, 1893. Rhode Island: One case at Providence. Texas: One case at San Antonio. West Virginia: Three cases at Lewisburg. Wisconsin: 23 cases in 12 localities, and small-pox at eight other localities. Total, at least 2,329 cases (a few were in 1893), in 103 localities (besides those in New York and Massachusetts) in eighteen States and two Provinces.

Because of the occurrence of small-pox as above mentioned, and the possibly increasing proportion of unprotected inhabitants, unusual watchfulness should be maintained, and suspicious cases carefully isolated, that all persons exposed directly or indirectly be promptly vaccinated, and all infected material destroyed or disinfected.

Physicians often diagnose small-pox as chicken-pox. All cases of eruptive disease, such as chicken-pox, rötheln, etc., should be isolated until it is *known* that the disease is not small-pox. If physicians and health officers will do this every time, the danger of spreading small-pox will be greatly diminished.

Upon the discovery of a case of small-pox, prompt action should be taken:—telegraph the facts to the Secretary of the State Board of Health at Lansing. Isolate the patient. All who have been exposed, or believed to have been exposed to the disease, should be isolated until their clothing, hair and beard have been disinfected, and their persons bathed. Persons exposed to the disease should be kept under surveillance at least fourteen days. Vaccinate all persons who have been exposed, and especially all nurses and attendants, using virus known to be fresh.* And, as the law requires, you should keep the Secretary of the State Board of Health "constantly informed respecting every outbreak of a disease dangerous to the public health, and of the facts * * * respecting sources of danger of any such diseased person or infected article being brought into or taken out of" the township, city or village of which you are the health officer.

But the proper preventive measures should be entered upon now, without waiting for the occurrence of a case. You and your local board should publicly recommend general vaccination and re-vaccination of all persons who have not been successfully vaccinated or had small-pox within the past five years.

Any aid which the State Board may be able to give you will be cheerfully rendered.

By direction of the State Board of Health.

Very respectfully,

HENRY B. BAKER,
Secretary.

Lansing, Mich., May, 1894.

*Foot-note on next page.

M. R. Lyman, M. D., health officer of Elmwood township, Tuscola county, wrote to the Secretary of this Board, June 1, 1894, relative to offering free vaccination in his jurisdiction, as follows:—

"Our board of health for the township of Elmwood, Tuscola county, are divided on the question whether to vaccinate the people of the township or not, and have decided to take your advice on the subject.

"I have been advocating thorough vaccination for there has never been anything of the kind done here to my knowledge, and I know that there has not within the last eleven years.

"Some of the board are afraid of the expense of vaccinating if a case of small-pox should not occur, and others say that it will be better to vaccinate than to run any chance of a greater expense to the township if a case should develop. I have advised the board to vaccinate by all means.

"Respectfully awaiting your reply, I remain yours truly."

June 4, 1894, the Secretary of this Board answered the above-quoted letter, as follows:—

"Replying to your letter of June 1, relative to vaccination,—*I think it important* that your local board take immediate action; and I recommend that your board publicly recommend general vaccination and re-vaccination and offer free vaccination with bovine virus, under Act 146, Laws of 1879, a copy of the law I send herewith."

W. R. Williams, health officer of Wise township, Isabella county, wrote to the Secretary of this Board, June 7, 1894, as follows, relative to the appointment of some person to give free vaccination in his jurisdiction:—

"DEAR SIR:—There has been application made to me to have a physician appointed here to vaccinate at public expense. Have I a right to appoint a physician for that purpose or is it the duty of the Board to take action in the matter? Please let me know as soon as possible what my duty is in regard to the matter, and oblige."

June 8, the Secretary of this Board answered the above-quoted letter, as follows:—

"Replying to your letter of June 7,—I send you herewith a two-page leaflet on which I have marked the law relative to vaccination. Section 1, of Act 146, reads 'that the board of health of each city, village and township may, at any time, direct its health officer or health physician to offer free vaccination, with bovine virus, etc.,' 'at the expense of each city, village or township, as the case may be.'

"The law does not authorize the health officer to 'offer free vaccination'; that authority is conferred on the local board of health. The health officer is to carry out the direction of the local board. Unless the local board of health has directed you to employ a physician to vaccinate, you have no authority to employ one.

"Your local board of health can and should offer free vaccination, and it should publicly recommend a general vaccination and re-vaccination. I recommend the vaccine virus propagated and sold by Dr. C. N. Hewitt, Sec., of the Minn. State Board of Health, Red Wing, Minn."

N. McClinton, M. D., health officer of the village of Cass city, Tuscola county, wrote to the Secretary of this Board, May 31, 1894, relative to the authority possessed by township and village boards of health in directing the free vaccination of the people. Dr. McClinton's letter read as follows:—

Foot-note to page 410:

*The Health Officer and every physician should be immediately vaccinated, if not recently successfully vaccinated. After visiting a small-pox patient, the health officer or physician should have a thorough change of clothing before seeing any other person. The clothing should be disinfected by fumes of burning sulphur, in a tight box or room, burning sulphur at the rate of three pounds to each 1,000 cubic feet of air space. The exposure to be for at least three hours. When changing the clothing the physician or health officer should have a thorough bath, and disinfect his hands, hair and beard. For this purpose physicians sometimes use a solution of mercuric chloride, one part to one thousand of water or cologne. The hands of nurses may perhaps be disinfected by washing in a solution of chlorinated soda.

"You will please pardon me if I ask a question which you may think impertinent. Cass City is in the Township of Elkland and is an incorporated village. The board of health or trustees of the Township granted the health officer of the Township the privilege of vaccinating all in the Township and Village at a stipulated amount, to be paid out of the village and township funds.

"The health officer of the village nor any other Dr. in the village knew anything about it until after he was empowered by them to to do so. Had they a right to grant him the privilege of vaccinating those in the Village when the Village had appointed a health officer for the Village? I would esteem it a favor if you could give me an answer before Tuesday next."

The Secretary of this Board answered the above-quoted letter, June 2, as follows:—

"Replying to your letter of May 31, relative to vaccination in the incorporated village of Cass City and the township of Elkland,—I send you herewith a copy of the State law (Act 146, laws of 1879) under which a board of health may offer free vaccination. The title of the act covers your question 'An act to authorize boards of health of cities, villages and townships to furnish vaccination to the inhabitants thereof', 'but at the expense of such city, village or township, as the case may be.' The township board of health has no jurisdiction in an incorporated village which may be within the limits of the township. The jurisdiction of a village board of health is only within the village limits.

"I think that the board of health of Elkland township, had no legal right to offer free vaccination to the inhabitants of the village of Cass City."

Dr. D. E. Robinson, health officer of Manistee, wrote to the Secretary of this Board, June 4, 1894, relative to the customary fee for vaccination, his letter was as follows:—

"Do you know what places in the State are furnishing free vaccination, and could you give me addresses of health officers of those places? I wish to know how much is being paid for the work at other places that the board of health here may be informed."

The Secretary of this Board wrote, June 5, in answer to the above-quoted letter, as follows:—

"Replying to your letter of June 4,—there ought to be at least 1,000 places in Michigan where they are offering free vaccination, but I have not yet the information on this point. I might refer you to Dr. Duncan McLeod, Health Commissioner of Detroit, where, I believe, four men are employed vaccinating.

"I have heard of one place where the local board of health have allowed thirty cents per head. I think that is little enough if every precaution is taken, and it is followed up to see if successful, as it should be."

Vaccination After Exposure to Small-Pox.

The following is a copy of a letter to the Secretary of the State Board of Health, from Duncan Hyndman, M. D., health officer of Norvell township, Jackson county, Michigan:—

"*Norvell, Mich., Nov. 22, 1894.*

"DEAR DOCTOR:—The following is the history of the small-pox case just closed here, about which you desire me to write.

"The patient, John Walz, about 30 years of age, who had never been vaccinated (one trial had been made on him as an infant without result) was exposed to small-pox by visiting a relative down with the disease. The case of Walz was distinctly typical—the eruption showing in exactly fourteen days from date of exposure—the agonizing back-ache and fever—the temperature being 105° for about three days before the eruption—the measley eruption which disappeared before the characteristic eruption appeared The case was confluent, there being over a hundred of the unhealthy shotty vesicles upon the forehead alone. Upon learning of the exposure three days after it occurred we made haste to vaccinate the man himself, also his wife and mother and two children, both under five years of age. This vaccination eleven days before the fourteenth after exposure, was successful on all but the man himself. Re-vaccinated all of them again three days after the first, and this time, being eight days before the dreaded fourteenth, succeeded most satisfactorily on all. Vaccinated the man Walz in two places the last time—The other in three places in the two times.

"The results were gratifying. During the first week of the eruption it was evidently aborting, and without doubt as the result of vaccination *eight days before the eruption.*

"The local treatment was to carefully puncture each vesicle with an aseptic needle, and press the contents gently into some absorbent cotton which we burned, and dress with carbolized vaseline.

"After a few days of the above local treatment we bathed the affected parts quite generally every second day with a wash made of Hg. Chlor. Corrosiv., of the strength of from ¼ to ½ a grain to the ounce of water.

"A complete and fine recovery. Certainly an aborted course, with scarcely a mark left, and not another case in the above family, whom necessity compelled to occupy the same house—the same rooms—continual contact with the contagium, scores one more big credit mark for vaccination.

"Yours most truly,
"D. HYNDMAN.

"*H. B. Baker, M. D., Sec. State Board of Health.*"

Vaccination of Large Numbers of Railway Employés.—Results.

The Secretary of this Board wrote to W. G. Henry, M. D., of Detroit, April 23, 1894, relative to vaccination of employés of the Chicago and Grand Trunk, and the Michigan Central railway systems, as follows:—

"I notice in the Detroit Tribune of April 19, 1894, an item relative to the vaccination of the Chicago and Grand Trunk and Michigan Central R. R. men. The item is headed, 'Have Vaccinated 2,100,' and the third paragraph reads: 'All the Michigan Central men, 2,100 in number, from Buffalo to Chicago and all the Chicago and Grand Trunk men 1,000 in number, from Port Huron to Chicago, have been vaccinated.' The figures given in this paragraph would make a total of 3,100. Will you have the kindness to tell me which number is correct? Also whether the newspaper article is substantially correct? I am interested in the subject, and should be glad to have a correct idea of just what has been done."

April 24, Dr. Henry answered the above-quoted letter from this Office, as follows:—

"Yours of 23rd inst. to hand today. I take pleasure in stating that the article in The Tribune referred to was approximately correct.

"Upon the M. C. R. R. we vaccinated 2,050 men—virtually all trainmen. Upon the C. and G. T. R. R we vaccinated 949 men from all positions—trainmen, agents, clerks, workshop men, etc.

"I enclose you a letter I received in reference to the men we vaccinated upon the M. C. R. R. at St. Thomas, Ont., Canada. It is very interesting from a statistical standpoint in reference to the percentage laid off on account of illness, also in reference to vaccination after having had small-pox. When you have done with the letter I enclose please return it to me as I desire to keep it as a valuable piece of information, and may read it at our next meeting of the Michigan State Medical Society in your city next week."

Below is given a copy of the letter and table mentioned in Dr. Henry's communication:—

"Office of Asst. Supt.,
"Canadian Division of Michigan Central R. R. Co.
"F. P. MacDonald, Asst. Supt. *April 23, 1894.*
"*Dr. W. G. Henry, 4 Adams Ave., West, Detroit, Mich.*

"Dear Sir:—Agreeable with your request, below find statement of men who had Small-pox, lately vaccinated, stating result, etc. I might here state for your information that out of the 500 vaccinated, 23 engineers and firemen, and 17 conductors and brakemen laid off on account of sore and badly swollen arms, or say 8 per cent.

Name.	Age.	Occupation.	Had Small-pox in Year.	Dates of previous vaccination.	Result in previous vaccination.	Date of last vaccination.	Result of last vaccination.
J. C.	49	Engineer	1851	1865, 1875, 1886	Good	April 11, '94.	No Good.
J. H. S.	37	"	1870	1875, 1885	No Good	" " "	" "
C. S.	55	"	1855	1886	" "	" " "	" "
A. R.	54	"	1861	1857, '56, '86	All Good	" " "	Good.
F. B. N.	43	Asst. Supt.	1854	Never.		" " "	Extra Good.
E. H. W.	42	Trainman	1854	"		" " "	" "
J. C.	25	"	1871	1884, 1889	No Good	" " "	Very Light.
M. R.	46	Cond'r.	1863	1885	" "	" " "	Good.

"Yours Truly,
"F. P. MACDONALD,
"*Asst. Supt.*"

INTER-STATE NOTIFICATIONS OF SMALL-POX.

In accordance with an agreement entered into at the International Conference of State and Provincial Boards of Health, held at Toronto, Oct. 6, 1886, notices were sent from, and received at, this Office during the year 1894 of the presence of small-pox in the following States and Provinces, with the approximate number of cases as stated in the reports:—Province of Quebec,—St. Lawrence Quarantine Station, 1 case; New Brunswick,—1 case; Ontario, —64 cases; Kansas,—30; Vermont,—22; Maryland,—15; Maine,—3; Minnesota,—30; Indiana,—64; Wisconsin,—27; Rhode Island,—5; Ohio,—18; Pennsylvania,—194; Illinois,—1,222. This shows only the number of cases stated in the reports received at this Office. Small-pox was epidemic in certain wards of the city of Chicago in 1894; there were 544 cases in the city in the month of April; 499 in May; 64 cases in the first 12 days of June; 50 cases in the month of July; 30 cases in the first 15 days of August. Reports stated a total of 35 cases of small-pox in the state of Illinois outside of Chicago.

As an example of those interstate notifications, one sent from the office of the Secretary of the Illinois State Board of Health is given below:—

"*State of Illinois,*
"*State Board of Health.*
"*Office of the Secretary.*
"*Springfield, May 23, 1894.*

"DEAR SIR:—In compliance with the resolutions adopted by the National Conference of State and Provincial Boards of Health at Toronto, 1886, and Washington, 1887, it becomes my duty to inform you that during the month of April there were 544 cases of small-pox in Chicago; during the past 21 days of the present month 431 cases have occurred there.

"Since my last report small-pox has existed and been stamped out at Harvey, Decatur, Rock Island, Rockford, Danville, Hoopston, Greenbush, Roodhouse, Alton, Almshouse in Grundy county, Madison, Madison Race Track, and in the vicinity of Upper Alton.

"At present there are four cases at Aurora, two at Evanston, two at Havana, one at Lombard, one at Freeport and one at Bloomington.

"Very truly yours,
"(Signed) J. W. SCOTT, M. D., *Secretary.*"

Notification of the escape of a possibly-infected person from Milwaukee, Wisconsin, to Mayville, Michigan.

U. O. B. Wingate, M. D., Secretary of the Wisconsin State Board of Health, wrote to the Secretary of this Board, Aug. 16, 1894, as follows:—

"DEAR DOCTOR:—I have just telegraphed you that Geo. Williams absconded from this city last night from a house infected with small-pox to Mayville, Mich. It appears that the physician who was called to the house reported the case existing therein to the Health Department but before the department could reach the house this Geo. Williams absconded.

"Will send you a statement of the situation here on Monday next. Everything is being done possible to prevent people from infected districts leaving the city."

The Secretary of this Board wrote, Aug. 18, 1894, to Dr. Wingate in answer to the above-quoted letter from him, as follows:—

"DEAR DOCTOR:—Accept cordial thanks for your telegram received Aug. 16, and for your letter of Aug. 16, received this morning, both relative to Geo. Williams absconding from a small-pox infected house in Milwaukee to Mayville, Michigan.

"Immediately on the receipt of your telegram, the information was telegraphed along to the health officer of Mayville. I have not heard from the health officer, but will inform you when I do.

"I shall be glad to have the statement of the situation in Milwaukee."

Letter giving the Small-pox situation in Minnesota.

Chas. N. Hewitt, M. D., Secretary of the Minnesota State Board of Health, sent the following letter to the Secretary of this Board, Sept. 1, 1894, giving the small-pox situation in Minnesota and in the cities of Chicago and Milwaukee:—

"MINNESOTA STATE BOARD OF HEALTH AND VITAL STATISTICS.
"OFFICE OF SECRETARY AND EXECUTIVE OFFICER.
"*St. Paul, Minn., Sept. 1, 1894.*

"DEAR DOCTOR:—The record of small-pox to date,——In Minnesota,—origin, Detroit—St. Paul, one case and family at Infectious Disease Hospital; Belle Plains, one case and family in tents outside the village. In Wisconsin,—from Chicago—only serious outbreak in Milwaukee, over 100 cases and increasing largely in the 11th ward, inhabited by Poles. They are fighting against vaccination, isolation and removal to Hospital, and by violence are resisting the local board of health. The State Board of Health of Wisconsin have just adjourned after a protracted meeting in Milwaukee. It decided to support the local board in every measure necessary to crush out the disease and to insist upon prompt and positive action. The arrangement made two weeks ago by the State Boards of Wisconsin and Minnesota with railroads, is in operation, and no infection directly from Milwaukee has yet reached our state. Never before has small-pox been so persistent in this country. The Health Commissioner of Chicago expects a new and severe outbreak this fall and winter there.

"*Precautionary measures for Minnesota.*

"I. Regular lookout for and inspection of all travelers likely to have been exposed in Milwaukee. Insist on clean record for persons and things and in case of doubt isolate, disinfect, vaccinate and revaccinate persons.

"II. Urge and secure as widely as possible the vaccination of all children and revaccination of adults in our own population. In proportion to the successful use of healthy and active vaccine is the general safety and the security of the vaccinated person practically absolute."

CHICKEN-POX (VARICELLA) IN MICHIGAN IN 1894.

The chief danger, in alleged outbreaks of chicken-pox, is that the disease may prove to be small-pox, therefore every such reported instance is carefully attended to by the office of the State Board of Health.

Five outbreaks of Varicella, from as many places in the State, were reported to the office of the Secretary of the State Board of Health. A total of 80* cases were reported form these places. Correspondence relative to the outbreaks is as follows:—

Outbreak of Chicken-pox in Alma village, Gratiot Co.

Under date of June 15, Dr. I. N. Brainerd, a correspondent of the State Board of Health, notified the Secretary of 2 cases of chicken-pox in 2 different households.

Outbreak of Chicken-pox in Macon Tp., Lenawee Co.

In his annual report to this Office, Dr. W. S. Worden, health officer of Macon Tp. reported that there had been present in his township, 75 cases of chicken-pox and stated further that "since making that report numerous* cases of chicken-pox have occurred, mostly of a mild form."

Outbreak of Chicken-pox (First reported Small-pox) in Napoleon Tp., Jackson Co.

May 15, the following item appeared in the Detroit Free Press:—

"Jackson, Mich., May 14.—(Special.)—The infant child of Fred J. Beamen died this afternoon. This is the second death in the Beamen family from small-pox within two weeks. There are a number of cases of varioloid now in the city, but not a case of small-pox. A case was discovered this evening, however at Ackerson's Lake, several miles from the city. The victim is Charles Clements, a lad of 17, who has been attending Delvin's [Devlin's] Business college in this city."

Secretary Baker immediately transmitted, to Dr. F. R. Crosby, health officer, Napoleon Tp., a letter of instructions accompanied by several copies of pamphlets, issued by this Board, "on the prevention and restriction of small-pox". In his letter, Secretary Baker stated,—"It is alleged that 'Charles Clements, a lad of 17, residing at Ackerson's Lake,' is ill with the disease. If the allegation is true, please telegraph the facts to this office upon receipt of this letter."

May 16, Dr. Crosby telegraphed Secretary Baker as follows:—

"6:30 just notified by Dr. Z. W. Waldron of Jackson Small-pox in Andrew Clements' family six miles west of here, will attend to at once."

May 17, Dr. Z. W. Waldron of Jackson wrote to Secretary Baker concerning this outbreak as follows:—

*The "numerous cases" aside from the 73 reported cases in Macon Tp. are not included in this number.

"The case of small-pox reported in the family of Andrew Clements of Napoleon yesterday has turned out to be chicken-pox. The case was reported on the 15th, as occurring in a patient who had never been vaccinated and yet who was having it in a light form. This being the case, I thought it best to wait a day before writing you; until the physician had verified his diagnosis. This he did yesterday and I immediately wrote you and telegraphed the health officer of Napoleon."

May 17, Secretary Baker wrote to Dr. Waldron thanking him for his letter of May 16, and stating that Dr. Crosby had telegraphed to the office concerning the outbreak and that he (Dr. Crosby) would attend to it at once.

On the same date Secretary Baker wrote Dr. Crosby as follows:—

"Accept thanks for your telegram of May 16, just received, relative to the outbreak of small-pox in your jurisdiction. I wrote to you relative to the subject May 15; also sent you on that date, leaflets and pamphlets on the restriction of the disease, which I trust have reached you by this time. If you can use more of the leaflets and pamphlets to good advantage, I will be pleased to send them to you upon your request. I trust that you and your local board of health will take vigorous action at once to confine the disease to its present location. Please keep me 'constantly informed' relative to the outbreak. Any assistance which this office can give you in your efforts to restrict the spread of the disease will be cheerfully rendered."

May 18, Dr. Crosby wrote Secretary Baker as follows:—

"In regard to the small-pox case in this township, there is disagreement among physicians whether the patient is suffering from small-pox, or chicken-pox. Neither the physicians nor the family notified me. The first I knew of the case was when I received your communication. On the same day received a telegram from Dr. Z. W. Waldron, health officer of Jackson, stating that small-pox was existing in this township. The house has been placarded and the family quarantined. Every precaution will be used to prevent the spread of the disease whatever it may prove to be.

"The Clements boy has not been very sick, not being confined to his bed any of the time."

May 19, Secretary Baker wrote to Dr. Waldron thanking him for his letter of May 17, and advising that extreme caution should be exercised relative to chicken-pox because of possible error. And on the same date he wrote to Dr. Crosby thanking him for his letter of May 18, and continuing said:—"I am pleased to learn that the necessary precautions were taken by you to prevent the spread of the disease in any event, and it will be well to continue the isolation of the patient a little while longer. Most of the *epidemics* of small-pox have resulted from cases called 'chicken-pox.'"

Outbreak of Chicken-pox in Cascade township, Kent Co.

Learning of an alleged outbreak of small-pox in Cascade Tp., Secretary Baker, on July 7, transmitted, to J. D. Lewis, the local health officer, instructions and pamphlets on the prevention of small-pox.

Not receiving any information from local health officer Lewis, Secretary Baker, July 11, wrote the following letter to H. B. Procter, Supervisor of Cascade Tp.

"April 28, 1894, you reported to this Office the name of John D. Lewis as the health officer of the township of Cascade. July 7 I sent him a communication, a copy of which is sent herewith. The law requires that the health officer shall 'keep the President of his own board of health, and the Secretary of the State Board of Health constantly informed respecting every outbreak of a disease dangerous to the public health.' A penalty for violation of this law is a fine, and imprisonment if the fine is not paid.

"§3439 Howell's Statutes, makes it the duty of the supervisor to prosecute for penalties incurred. When I wrote to the health officer, July 7, I had been informed that there was a case suspected to be

small-pox, (varioloid,) in Cascade, and today I am in receipt of a letter from Cascade saying that the case has been pronounced by Dr. Lewis to be varioloid. Not a word has been received from Dr. Lewis, health officer. This would seem to make it certain that Dr. Lewis has violated the law which requires him to keep this office informed. It would seem to be your duty to institute proceedings against him.

"However, the main purpose of this letter to you is to ask that prompt measures be taken to restrict small-pox if present, and to give this Office prompt notice of the facts, whatever they may be, so that action of this Board may be based upon knowledge of the facts, and unnecessary expense by the State, be avoided, if the disease is simply chicken-pox as it has been reported to have been announced by Dr. Fuller, of Grand Rapids.

"If the case is varioloid, please telegraph this Office at once. If it is chicken-pox, please have a letter to that effect sent here by return mail."

July 13 Mr. Procter wrote to Secretary Baker as follows:—

"Yours of the 11th at hand, in regard to the case reported from the township of Cascade, said to be varioloid is simply a case of chicken-pox. The young man that was sick was not confined to his bed at all. * * *"

Outbreak of Chicken-pox in Nadeau Tp., Menominee Co.

Secretary Baker, having learned of an outbreak of alleged small-pox in Nadeau Tp., wrote to Dr. A. B. Opicka, health officer of the township, and in a reply dated March 16, Dr. Opicka said that every possible precaution was being taken to prevent the spread of the disease. Dr. Opicka also said "On the 14th a. m. I was ordered from the supervisor to go and see a few families, living about 1½ miles from the village, because they were reported as having small pox. When I visited the houses I found it to be chicken-pox (varioloid), but their symptoms would show a hard case. I could not find out if they were down to Menominee or Marinette or somewhere else where small-pox was. But I have disinfected all their houses thoroughly and ordered all the members of their families to stay at home."

March 17, Secretary Baker wrote to Dr. Opicka as follows:—

"You state that you visited a family and found them to be infected with "chicken pox (varioloid)". I would be pleased to learn without delay which the disease was, *chicken pox or* varioloid. If it was varioloid, then the same precautions should be taken to prevent its spread as if it was small-pox, because varioloid is a mild form of small-pox, and persons infected by such cases may have malignant small-pox."

Mar. 17, Secretary Baker wrote to Louis Nadeau, Supr. of Nadeau Tp. concerning the outbreak and in a reply, dated March 19, Mr. Nadeau said that general vaccination would be made at town expense and all necessary precautions taken. March 21, Secretary Baker replied, thanking Mr. Nadeau for his letter and expressing pleasure that such strict and energetic actions were taken by the local Board of Health.

In this outbreak, Dr. Opicka, the resident physician and health officer of Nadeau complained that Dr. Sawbridge of Stephenson had been engaged to do the vaccination in Nadeau Tp. In a letter to Louis Nadeau, Supr., Secretary Baker said "Section 1685 Howell's Statutes provides that the board of health of any township may at any time '*direct its health officer or health physician to offer vaccination*,' etc., but does not provide that they shall engage any physician that they may see proper. I think that as a rule the health officers are underpaid for their services, and they should be engaged to do the general vaccination when circumstances require that such work should be done, unless there are some extraordinary conditions, and then there is no law for any other method."

CONSUMPTION IN MICHIGAN—YEAR ENDING DECEMBER 31, 1894.

During the year ending December 31, 1894, there were reported to the Secretary of the State Board of Health 2,060 cases and 1,581 deaths from consumption in Michigan. These reports were received from 590 localities in the State. This is probably less than the actual number of consumption-infected localities in Michigan, much less than the actual number of deaths, and very much less than the actual number of cases. Many cases are of long duration, and in the early stages and sometimes in the latest stages are not under the care of a physician, as a consequence many of these cases are not reported. From many localities only the deaths from consumption are reported; therefore the apparent ratio of deaths to cases is much too high.

For the year 1894 there were reported to the Secretary of State 2,206 deaths from consumption, or 625 more than were reported to this Office; and the Secretary of the State Board of Health has estimated that the deaths returned to the Secretary of State should be increased by forty per cent to make them equal the number which actually occur.

DISTRIBUTION OF CONSUMPTION IN MICHIGAN IN 1894.

The following Tables, 1 and 2, and accompanying map, exhibit, in different ways, the distribution of the reported consumption in Michigan in 1894. Table 1 shows that the reported sickness-rate from this disease, for the year, for the whole State, was 9.19 cases per 10,000 of population; and that the reported death-rate per same number of inhabitants, was 7.05. Table 1, shows also that the greatest reported sickness-rate from this disease in 1894, was in Crawford county, where the ratio of cases to population was 25.83 to 10,000. Other counties where the sickness-rates were largely in excess of the average rate for the State, were: Schoolcraft, 19.64; Alcona, 16.63; Kalkaska, 15.97; Menominee, 15.59; Kent, 15.01; Marquette, 15.00 cases per 10,000 of population. The lowest reported sickness-rate from consumption (where such sickness occurred) for the year, .56 of one case per 10,000 of population, was in Alpena county. Other counties whose sickness-rates were much *below* the average for the State, were: Gogebic, 1.42; Arenac, 1.44; Delta, 1.56; Presque Isle, 1.69; Iron, 1.90 cases per 10,000 of population. The greatest reported death-rate from this disease during the year, 16.84 deaths per 10,000 of population, was in Schoolcraft county. Other counties where the death-rates were much above the average death-rate for the State, were: Menominee, 14.75; Alcona, 12.94; Mason, 11.94; Kent, 11.65 deaths per 10,000 of population. The lowest death-rate (where death occurred), .71 of one death per 10,000 of population, was in Gogebic county. Other counties where the death-rates were far *below* the average death-rate for the State, were: Cheboygan, .72; Delta, 1.04; Dickinson, 1.36; Arenac, 1.44 deaths per 10,000 of population.

From the following six counties: Baraga, Keweenaw, Lake, Luce, Ontonagon and Roscommon,—having an aggregate population of 23,809, no diphtheria was reported during the year. From Alpena, Gladwin, Montmorency and Presque Isle counties, there was an aggregate of four cases of consumption reported, with no deaths.

The proportionate fatality from consumption in 1894, *i. e.*, the proportion of reported cases which proved fatal, was, for the whole State, 76.7 per cent, or more than 3 deaths to every 4 cases reported. From the following ten counties: Arenac, Emmet, Houghton, Iron, Manitou, Midland, Missaukee, Ogemaw, Oscoda, and Otsego only the fatal cases were reported. In Berrien county the fatal cases were 97.2 per cent of all reported cases, and in Wayne county 96.3 per cent. The minimum fatality (12.5 per cent of reported cases) occurred in Cheboygan county; and in Benzie county the fatality was 16.7 per cent of reported cases.

The map which follows Table 1, shows for each county of the State the reported sickness and death-rates per 10,000 inhabitants, and the number of localities where the disease was present during the year.

Table 2 exhibits the latitudinal distribution of consumption throughout the State, by tiers of counties; all the counties of the Upper Peninsula considered as one tier. By this table (2), it appears that the lowest sickness-rate (3.85 per 10,000 of population) was in the tenth tier of counties; the eleventh tier was next in lowest sickness-rate, and then come the extreme southern and northern tiers of counties, they being respectively 7.30 and 7.55 per 10,000 of population. The tier of counties having the greatest sickness-rate (13.37 per 10,000 population) was the ninth. Other tiers in which the sickness-rates were above the average, were the second with 11.05, and the fourth with 10.56 cases per 10,000 inhabitants.

TABLE 1.—*Numbers of Cases and Deaths reported from* **Consumption** *per 10,000 persons living in each county in Michigan during the year 1894. (Compiled from reports of health officers, clerks, etc.)*

Counties.	Population for 1894.*	Number of reported		Number, per 10,000 population, of		Counties.	Population for 1894.*	Number, of reported		Number, per 10.000 population, of	
		Cases.	Deaths.	Cases.	Deaths.			Cases.	Deaths.	Cases.	Deaths.
State	2,241,454	2,060	1,581	9.19	7.05	Keweenaw	2,804	0	0	0	0
						Lake	5,595	0	0	0	0
Alcona	5,411	9	7	16.62	12.94	Lapeer	28,874	23	15	7.97	5.19
Alger	1,384	2	1	14.45	7.23	Leelanaw	9,395	9	7	9.58	7.45
Allegan	39,155	37	23	9.44	5.87	Lenawee	48,541	43	34	9.89	7.00
Alpena	17,715	1	0	.56	0	Livingston	20,435	16	7	7.80	3.43
Antrim	12,427	6	4	4.83	3.22	Luce	2,348	0	0	0	0
Arenac	6,941	1	1	1.44	1.44	Mackinac	7,237	10	4	13.82	5.53
Baraga	4,232	0	0	0	0	Macomb	32,352	39	27	12.04	8.34
Barry	23,699	15	14	6.33	5.91	Manistee	26,112	30	26	11.49	9.96
Bay	61,292	61	44	9.95	7.18	Manitou	917	1	1	10.90	10.90
Benzie	8,060	12	2	14.89	2.48	Marquette	38,004	57	36	15.00	9.47
Berrien	45,628	36	35	7.89	7.67	Mason	18,418	24	22	13.03	11.94
Branch	26,204	21	19	8.01	7.25	Mecosta	20,730	18	16	8.68	7.72
Calhoun	47,471	44	25	9.27	5.27	Menominee	23,736	37	35	15.59	14.75
Cass	21,176	14	10	6.61	4.72	Midland	13,223	8	8	6.05	6.05
Charlevoix	10,931	10	9	9.15	8.23	Missaukee	6,956	3	3	4.31	4.31
Cheboygan	13,596	8	1	5.76	.72	Monroe	33,179	18	14	5.43	4.22
Chippewa	15,319	6	4	3.92	2.61	Montcalm	24,155	24	16	9.95	4.68
Clare	7,975	7	4	8.78	5.02	Montmorency	2,435	1	0	4.11	0
Clinton	26,262	29	25	11.04	9.53	Muskegon	37,323	47	42	12.59	11.25
Crawford	2,710	7	3	25.83	11.07	Newaygo	19,124	9	6	4.71	3.14
Delta	19,259	3	2	1.56	1.04	Oakland	42,668	52	25	12.19	5.86
Dickinson	14,699	4	3	2.72	1.36	Oceana	16,597	9	6	5.42	3.62
Eaton	32,612	15	13	4.60	3.99	Ogemaw	5,636	3	3	5.32	5.32
Emmet	10,331	7	7	6.74	6.74	Ontonagon	6,873	0	0	0	0
Genesee	40,553	44	24	10.85	5.92	Osceola	16,475	13	5	7.23	3.03
Gladwin	4,900	1	0	2.04	0	Oscoda	1,804	1	1	5.54	5.54
Gogebic	14,083	2	1	1.42	.71	Otsego	4,794	1	1	2.09	2.09
Gd. Traverse	17,514	17	15	9.71	8.56	Ottawa	39,075	18	17	4.61	4.35
Gratiot	28,770	31	27	10.77	9.38	Presque Isle	5,910	1	0	1.69	0
Hillsdale	30,271	13	12	4.29	3.96	Roscommon	1,657	0	0	0	0
Houghton	44,174	20	20	4.53	4.53	Saginaw	81,841	23	16	2.81	1.96
Huron	32,249	18	12	5.58	3.72	Sanilac	33,944	48	18	14.14	5.30
Ingham	39,689	30	27	7.56	6.80	Schoolcraft	7,127	14	12	19.64	16.84
Ionia	34,817	42	28	12.06	8.04	Shiawassee	32,527	32	22	9.75	6.70
Iosco	12,389	6	3	4.86	2.43	St. Clair	54,315	29	22	5.34	4.05
Iron	5,293	1	1	1.90	1.90	St. Joseph	25,087	18	16	7.17	6.38
Isabella	21,439	26	16	12.13	7.46	Tuscola	34,411	37	30	10.75	8.72
Jackson	46,527	57	51	12.25	10.96	Van Buren	31,059	25	18	8.05	5.80
Kalamazoo	42,055	52	39	12.36	9.27	Washtenaw	43,491	51	44	11.73	10.12
Kalkaska	5,637	9	6	15.97	10.64	Wayne	292,495	327	315	11.18	10.77
Kent	121,919	183	142	15.01	11.65	Wexford	14,047	20	12	14.24	8.54

* Statements of population derived from the State Census of 1894.

DISTRIBUTION OF CONSUMPTION IN MICHIGAN IN 1894.
BY COUNTIES, THE REPORTED CASES AND DEATHS PER 10,000 INHABITANTS.



L.= Localities; C.= cases per 10,000 population; D.= Deaths per 10,000 population.

[PLATE 848]

TABLE 2.—*Exhibiting the Population of Michigan for the year 1894, by tiers of counties (Upper Peninsula as one tier); also the number of cases of and deaths from Consumption* REPORTED *from each of these divisions for 1894, and the number of cases and deaths per 10,000 population of each division.*

Counties in Groups, most Northern ones First.		Population, 1894.*	Reported Cases of Consumption, 1894.	Average Reported Cases per 10,000 Population.	Reported Deaths from Consumption, 1894.	Reported Deaths from Consumption per 10,000 Population.
State		2,241,454	2,060	9.19	1,581	7.05
Upper Peninsula	Alger. Delta. Schoolcraft. Luce. Houghton. Ontonagon. Gogebic. Baraga. Mackinac. Chippewa. Keweenaw. Marquette. Iron. Menominee. Dickinson.	206,572	156	7.55	118	5.71
Eleventh tier of counties	Manitou. Emmet. Charlevoix. Cheboygan. Presque Isle.	42,085	27	6.42	18	4.28
Tenth tier of counties	Leelenaw. Antrim. Otsego. Montmorency. Alpena.	46,766	18	3.85	12	2.56
Ninth tier of counties	Benzie. G'd Traverse. Kalkaska. Crawford. Oscoda. Alcona.	41,136	55	13.37	34	8.26
Eighth tier of counties	Manistee. Wexford. Missaukee. Roscommon. Ogemaw. Iosco.	66,747	62	9.29	47	7.04
Seventh tier of counties	Mason. Lake. Osceola. Clare. Gladwin. Bay. Huron. Arenac.	154,145	124	8.04	88	5.84
Sixth tier of counties	Oceana. Newaygo. Mecosta. Isabella. Midland.	91,113	70	7.68	52	5.71
Fifth tier of counties	Muskegon. Montcalm. Gratiot. Saginaw. Tuscola. Sanilac.	250,414	220	8.80	149	5.95
Fourth tier of counties	Ottawa. Kent. Ionia. Clinton. Shiawassee. Genesee. Lapeer. St. Clair.	378,642	400	10.56	295	7.79
Third tier of counties	Allegan. Barry. Eaton. Ingham. Livingston. Oakland. Macomb.	230,670	204	8.84	136	5.90
Second tier of counties	Van Buren. Kalamazoo. Calhoun. Jackson. Washtenaw. Wayne.	503,098	556	11.05	492	9.78
First tier of counties	Berrien. Cass. St. Joseph. Branch. Hillsdale. Lenawee. Monroe.	230,086	168	7.30	140	6.08

* Statements of population derived from State Census of 1894.

CONSUMPTION IN 1894, COMPARED WITH 1893.

According to the reports made to the Secretary of the State Board of Health.

The compilation of information relative to the prevalence of consumption in Michigan, as reported to the Office of the Secretary of the State Board of Health, was made for the first time for the year 1893. Table 3 shows the reported number of cases and the number of deaths from consumption, the number of localities where the disease was reported present, the average numbers of cases and deaths per locality, and the deaths per 100 cases, for the years 1893–94. There were more localities, cases and deaths reported in 1894 than in 1893; this annual increase will probably continue until the *reported* numbers quite nearly agree with the *actual* numbers of infected localities, and of the cases and deaths which occur.

TABLE 3.—CONSUMPTION IN MICHIGAN.—*Numbers of reported cases and deaths, Number of Localities in which they occurred, Average number of cases and deaths per locality, and the per cent of cases which proved fatal, as reported for each of the two years, 1893-94.*

Year.	Reported localities.	Reported cases.	Average cases per locality.	Reported deaths.	Average deaths per locality.	Deaths per 100 cases.
1893	525	1,988	3.8	1,509	2.9	75.9
1894	590	2,060	3.5	1,581	2.7	76.7

According to the reports made to the Secretary of State.

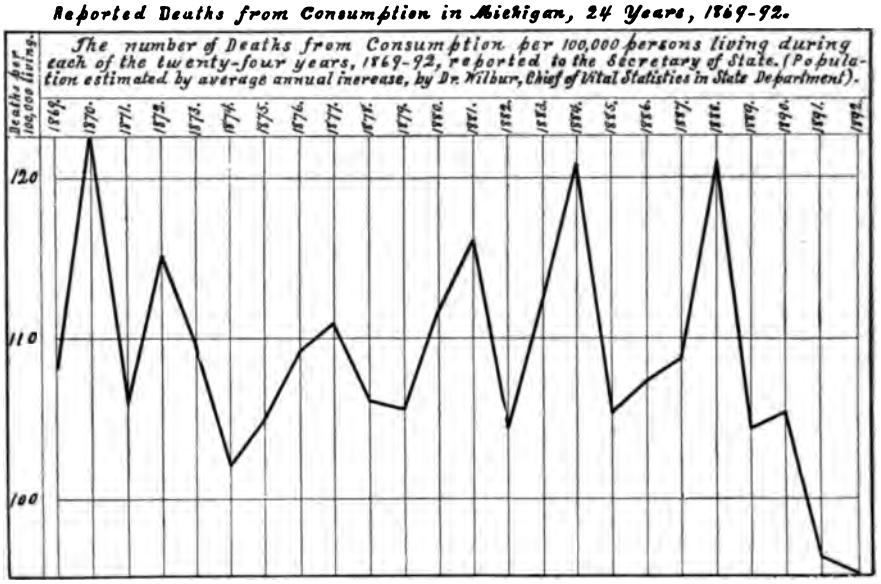
The reports to the Secretary of the State Board of Health, while useful for many purposes, are not yet useful for comparing the deaths in one year with the deaths in another year, for reasons already stated. On the other hand, not all deaths are reported to the Secretary of State, but probably the omissions are about the same in every year, therefore the statistics of the State Department are useful for comparing one year with another.

The following table (4) and diagram (No. 1) stating the number of deaths from consumption per 100,000 persons living, reported to the Secretary of State, probably quite accurately represent the annual fluctuations of, but not the total deaths from consumption in Michigan during the 26 years, 1869–94. The diagram includes the years 1869 to 1892 inclusive.

TABLE 4.—*Exhibiting the number of reported deaths from Consumption per 100,000 persons living in Michigan in each of the 26 years, 1869–94. Compiled from the Secretary of State's Vital Statistics of Michigan. (Population for intercensal years estimated by average annual increase, by Dr. Wilbur, Chief of Vital Statistics in State Department.)*

Year.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.
Deaths	108.1	122.5	106.0	115.1	109.6	102.0	104.9	109.2	110.9	106.1	105.6	111.7	116.1
Year.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.
Deaths	104.4	112.3	120.8	105.3	107.3	103.7	121.0	104.3	105.4	96.3	95.2	97.7	98.4

Reported Deaths from Consumption in Michigan, 24 Years, 1869-92.



[Plate 552.]

By Table 4 and the diagram Plate 552, it may be seen that there was a marked decrease in the death-rate from consumption in 1889 as compared with the previous year, this was followed by a slight rise in 1890. In 1891 there was another decided decrease in the death-rate from consumption in Michigan. The first mentioned decrease may be only the usual inter-epidemic period. The second one is remarkable as it was the first time that the disease had ever decreased so much, and it occurred at a time when influenza was epidemic in this country, and the statistics for the eastern States show an increase in the death-rate from consumption, which increase was attributed to the influence of the epidemic influenza.

It is probable that the decrease in the death-rate from consumption in Michigan beginning in 1891 and continuing in 1892 was due to the efforts

of the State Board of Health to educate the people in methods of restricting the disease.

In 1881 Bela Cogshall, M. D., of Flint, Mich., read a paper at the Battle Creek Sanitary Convention entitled "Consumption: Is it a Contagious Disease? What can be Done to Prevent its Ravages?" Copies of this paper were distributed by the State Board of Health.

In a supplement to the Annual Report of this Board for 1886, was printed a paper by Bion Whelan, M. D., of Hillsdale, Mich., entitled "Consumption.—Its Causes and Prevention." This paper was distributed by the State Board of Health.

A leaflet entitled "The Causation of Consumption," was reprinted from the Annual Report of this Board for the year 1888, and distributed by the Board.

A. Arnold Clark, of Lansing, read a paper at the Pontiac Sanitary Convention, held in 1889; the title of the paper was "The Prevention of Consumption." At the Vicksburg Sanitary Convention, held in 1889, Mr. Clark read a paper on this same subject. These papers were widely distributed by the Board.

The above-mentioned papers were printed in pamphlet form, and sent where it was thought they would be of service in educating the people in methods for preventing the spread of the disease. This "campaign of education" may account for the reduction in the death-rate from consumption, at a time when the efforts of this Board should begin to show some results.

The first edition of the four-page leaflet bearing directly upon the restriction and prevention of consumption, was issued by the Board in September 1891, and widely distributed; and in October 1893 a large edition of a small slip [224] publishing the resolution adopted by the State Board of Health including consumption in the official list of "Diseases dangerous to the public health," was printed, and very widely distributed by the Board.

PREVALENCE OF CONSUMPTION BY YEAR AND MONTHS.

TABLE 5.—*Exhibiting the Number and Per Cent of Cases of Consumption reported to have taken sick, in each Month during the Years 1890-94. (Compiled from such reports to the State Board of Health, in 1894, as stated the time when taken sick.)*

Year.	Total Number.	Number taken sick in each month.											
		Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1890	2			1								1	
1891	6	1		1	2		1		1				
1892	14	1			2	4	2	1	1	3			
1893	66	6	3	4	4	5	4	4	4	6	9	7	10
1894	354	47	18	30	22	21	31	34	48	26	28	24	25
Totals	442	55	21	36	30	30	38	39	54	35	37	32	35
Percentages	100	12.4	4.1	8.1	6.8	6.8	8.6	8.8	12.2	7.9	8.4	7.2	7.9

The number of cases included in Table 5 is probably too small to give correct information as to the time of year when consumption is most likely to attack persons. The continuance, for a number of years, of the information contained in this table will probably show the season when persons are most likely to sicken with the disease.

TABLE 6.—*Exhibiting, by Months, the number of deaths from Consumption that were reported to have occurred in Michigan in 1894. (Compiled from such reports to the State Board of Health, as stated the time of death.)*

Year.	Total Number.	Number of deaths for each month.											
		Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1894	453	32	28	33	41	45	40	36	33	35	37	41	52

SOURCE OF CONTAGIUM OF CONSUMPTION.

Of the 2,060 cases of consumption reported, during the year 1894, as exhibited in Table 7, the local health officers reported the source of contagium as follows: Traced to a former case, 11; reported as inherited, 81; attributed to "taking cold" or "exposure," 39; attributed to "La Grippe", 13; attributed to contagium from outside of jurisdiction, 20; unknown or indefinitely reported, 476; source not reported, 1,420; total, 2,060.

TABLE 7.—*Reported Source of Contagium of Consumption in 1894.*

Source.	Numbers of cases.
Cases reported as traced to a former case	11
Cases reported as inherited	81
Cases attributed to "taking cold" or "exposure"	39
Cases attributed to "La Grippe"	13
Cases attributed to contagium from outside of jurisdiction	20
Cases the sources of contagium of which were reported as unknown, or the statements were too indefinite for classification	476
Cases the sources of contagium of which were not reported	1,420
All cases	2,060

HOW CONSUMPTION IS SPREAD.

The tubercle bacillus, the specific cause of consumption, is found in the sputa of persons suffering from that disease whenever there is a disintegration of lung tissue. The dried sputum still contains the bacillus in a passive state. The dust of dried tubercular sputum when inhaled by susceptible persons is thought to be the most common way of transmitting pulmonary consumption from person to person. Members of a fam-

ily, in which there is a consumptive, are constantly exposed to the danger of infection unless the sputa are collected and destroyed. The object of much work done by the State Board of Health is to educate the people in this simple means for restricting the spread of consumption.

Below are given copies of letters, hektographed material, printed circular, and other data and statements bearing upon this subject:—

Doctor Gamber, of Stanton, Michigan, wrote to the Secretary of this Board reporting three cases of consumption, as follows:—

(1) "Stanton, Michigan.

"Right lung at apex is consolidated. Sputum contains a number of tubercle bacilli; a very large number of streptococci; a large number of staphylococci, and a few of the micrococcus tetragenus; also pus cells."

(2) "Day township. P. O. Stanton.

"Since last fall has grown more hoarse, with an aggravating cough, so that now he has entirely lost voice. The expectoration is quite profuse. Sputum shows tubercle bacilli, and quite a number of the streptococcus pyogenes and staphylococcus aureus. Lungs apparently all right."

(3) "Stanton, Michigan.

"Marked dullness at apex of left lung. Profuse purulent expectoration, and sputum contains tubercle [bacilli] quite plentifully. The streptococcus pyogenes, and staphylococcus are very numerous; also contains pus cells."

C. W. Logan, M. D., health officer of Cedar township, Mackinac county, in his weekly report made to this office, Oct. 1, 1894, stated the presence of one case of consumption in his jurisdiction. In a note attached to the report he stated, "This case, or patient, is intending to teach school. Has she any right to do that? Have I authority to prevent her from so doing?"

The Secretary of this Board answered the above-quoted letter from Dr. Logan, on Oct. 3, 1894, as follows:—

"In response to your letter, Consumption is a 'disease dangerous to the public health', and you can see from the law, what is required of the health officer in such a disease. Act 137, laws of 1883, defines the duty of the health officer. I have marked that law on page 3 of the enclosed pamphlet. If the person to whom you refer, is a coughing consumptive, and expectorates upon the floor, etc., she is likely to spread the disease; but if she complies with the recommendations of this Board, as noted on the enclosed slip, little danger need be feared.

"I enclose herewith a page of hektograph, which may be of interest to you. Under Act 137, Laws of 1883 the health officer must order the isolation of sick or infected persons so long as there is danger of their spreading the disease. If the teacher does as this Board recommends, there would not be much danger of spreading the disease, so the health officer might not be obliged to order isolation."

The following circular showing the danger of consumption being communicated to pupils by a teacher having the disease, was sent from the office of the State Board of Health to the principal newspapers of this State and to sanitary exchanges:—

"CONSUMPTION PROBABLY SPREAD BY A SCHOOL TEACHER.

"The Secretary of the State Board of Health has received from a local health officer in Michigan a letter which reads substantially, as follows:—

"..... *August 14, 1894.*

"DEAR SIR:—Last year a lady was employed in our school as teacher. I am credibly informed by those with whom she boarded that she went once a month to Lansing to be treated for pulmonary consumption, also that she occasionally received treatment from Dr. —— of this place. She remained in school until March or April, and then told the board that she was too weak to teach, and went to her sisters and *died* of *tubercles of the lungs*. One girl who attended school has since *died* with 'Quick Con-

sumption.' May 1, I was appointed health officer and, as soon as the board met, called the attention of the board to the danger, and have urged upon them the necessity of disinfecting the school house. Now the time is soon coming when school should begin again. What should be done?

"The Secretary replied that he thought the disinfection of the school-room was important, and should certainly be done before the opening of the school; that it is quite probable that tubercle bacilli are still existing in the school-room, and may under favoring conditions infect a child or teacher with that disease, which causes more deaths in Michigan than any other disease. It is especially important that the rooms be disinfected if the teacher had been in the habit of expectorating on the floor, for it is known that the tubercle bacillus, when in a dry state, remains active for a considerable length of time. In dried sputa the bacillus is tenacious of life. The law maks it the duty of the health officer to see that clothing, premises, rooms, and all articles liable to convey infection, are disinfected. After death from tuberculosis, or recovery from a well-developed case of the disease, there should be disinfection of everything liable to spread the disease to others. The sulphur burned should be at the rate of three pounds of sulphur to each thousands cubic feet of air space."

Doctor O. W. Took, health officer of Flushing township, Genesee county, wrote to the Secretary of this Board, July 10, 1894, reporting as follows relative to the possible transmission of consumption from husband to wife:—

"An interesting, though sad, case of contagion occurred here. A Miss S——, bright, healthy girl, married a man named J—— N——, some two or three years since, who had consumption. Shortly after their marriage he grew worse, and required her constant care while she was able to care for him—always sleeping with him. During the early spring of '94 she died—having been sick nearly a year; he following her a couple of months later.

"I have no positive data to give you—only state the facts, as I believe them, that her death was caused by contagion from him."

Dr. H. W. Heasley, of Burnips Corners, Allegan county, wrote to the Secretary of this Board, Dec. 26, 1894, on the subject of consumption, as follows:—

"Relative to consumption, I am inclined to think we will never reach the masses by our present process of instruction. The notices that are sent out by your department will be slow to halt the present public opinion. I do not mean to say it is a useless waste of time for it will perform its mission just in proportion as the public will observe. I have talked it at the bedside but with less effect than I preferred. It would seem to me if each physician on the Board of Health were to deliver one or two lectures on that subject by request of the State Board it would be blessed with good results. So many physicians are in doubt as to its possible infectious character saying nothing of its 'Danger to the Public Health' and what is still worse there are many who teach the exactly opposite theory that if they were required to deliver at least one lecture during the year on that subject it would convert many physicians as well as the laity. I am preparing to do so and anything you can send me on that subject would be considered a personal favor."

December 29, 1894, the Secretary of this Board wrote to Dr. Heasley, in answer to the above-quoted letter as follows:—

"Relative to the education of the people and physicians, on the importance of the restriction and prevention of consumption,—This Board has in the last fifteen years held some forty-two sanitary conventions in different parts of the State. At such Conventions, from time to time, papers have been read on the causation and restriction of consumption. The subject is of great importance. I think your suggestion is a valuable one. I am glad to know that you intend preparing a paper on the subject.

"In accordance with your request I have sent you by mail a number of publications of this Office bearing upon the work for the restriction of consumption.

"If I can be of further use to you, it will give me pleasure."

Neglect of Measures for the Restriction of Consumption, in Emerson township, Chippewa county.

Mr. G. Helms, Supervisor of Emerson township, Chippewa county, wrote to the Secretary of this Board, Sept. 14, 1894, stating his desire to aid in measures for the restriction of consumption, as follows:—

"DEAR SIR:—I received the list of Health Officers and see that Emerson is vacant. The board appointed Charles T. Eno, of Ithaca. He is not a physician nor supervisor, but is capable to perform the duties of that office. I am sure the clerk sent the notice to you but it must have gone wrong. Now I believe as you do that consumption is one of the most contagious diseases and should be looked after as much as any, while now it is the least looked after. There have been several persons die in the township this summer and some more that will die, and I have doubts whether the health officer has had notice from either householder or physician. I went to see a person a few days ago that had it and she was coughing and raising a good deal, and using an old pan to spit in, and was not using precaution enough, I think, for the benefit of others. It is so in almost all the cases. I believe that the health officers of each township should be empowered, as soon as he has notice of a consumptive, to serve a notice of precaution on the person or family that has it, the notices to be in printed form and dictated by the State Board of Health. I think there should be more co-operation and more push in the matter than there is, so that the results of the labor may show. Let us all try to make the number of deaths from consumption less in the next report given out by your board."

September 19, 1894, the Secretary of this Board answered the above-quoted letter, from Mr. Helms, as follows:—

"DEAR SIR:—Your letter of Sept. 14, has been received, for which please accept cordial thanks. I highly appreciate your sentiments relative to the adoption of precautionary measures looking toward the prevention of the spread of consumption.

"This Board is always ready and willing to co-operate with local health officials in their efforts to attain that desired end.

"I herewith send you printed slips and a pamphlet, published by this Board in large quantities, which are designed for distribution to persons suffering with consumption, their families and near neighbors, and which may be had on application to this office."

HOW CONSUMPTION IS RESTRICTED.

Doctor Carlos Glazier, health officer of Royal Oak township, sent an outbreak report to this office, Aug. 17, 1894, which stated substantially as follows:—One case of consumption in Royal Oak township, has come to my knowledge. The disease was taken from a step-daughter, about one year ago. The patient is a female about 42 years old. I was sent for in July last; made five visits. I stated to herself and family, when first seen, that she would soon die; stated to all that it was a dangerous communicable disease, and that precautions should be taken to prevent its spread.

Samuel Stevens, M. D., health officer of Keeler township, Van Buren county, reported on May 12, 1894, relative to a case of consumption in his jurisdiction, substantially as follows:—I was called to see Mrs.———, aged about 40 years, on May 9, 1894. She has been sick for some years. The danger of the disease spreading is not great for the reason that they are near the center of the township. They are poor people and do not go about much. I have directed her to "spit" on a small cloth and burn it, immediately.

A Case Where Instructions Were Followed.

Dr. J. F. Jenkins, of Tecumseh village, Lenawee county, in his weekly postal-card report, for the week ending April 14, 1894, mentioned one case of consumption as being under his observation; the Secretary of this Board wrote to Dr. Jenkins on April 26, relative to the case, as *follows*:—

"In your weekly postal-card report for Tecumseh and 'vicinity' for the week ending April 14, you note one case of consumption under your observation. I inferred that the case was in the village of Tecumseh and wrote to the health officer of that village relative to it. * * *.

"From the tone of the health officer's letter, I infer that he knows nothing of a case of consumption in Tecumseh. * * * ."

Dr. Jenkins answered the above letter from this Office, April 27, 1894, as follows:—

"DEAR DOCTOR:—The case of 'consumption' reported by me lived one mile west of this village in the Township of Tecumseh, named —— ——, died on the 18th of this month of consumption. I attended the patient during the latter part of her illness, and gave the family a paper on 'Restriction and Prevention of Consumption'. In this case, I think every means were used in order to prevent the spread of the disease."

In July, 1894, 500 copies of the following circular letter were printed, and have been used where they were of service in securing information relative to consumption:—

[Official demand for special reports relative to consumption, under Section 8, Act 81, Laws of 1873.]

OFFICE OF THE SECRETARY OF THE MICHIGAN STATE BOARD OF HEALTH.

[213]

Lansing, Mich.,_____ *189*____

*To*_____

*Health Officer of*_____

_____ *Mich.*

Dear Sir:—On_____189__I wrote to you relative to consumption in your jurisdiction*, sending you blanks for reports to this office, and leaflets on the restriction and prevention of that disease, for distribution among those likely to be endangered. No report or other information has been received from you since_____

Consumption is the most destructive disease in Michigan at this time; it is now known to be a *communicable* disease, and it has been decided by this State Board that it be included in the official list of diseases "Dangerous to the public health," and as such, it is the health officer's duty, *under the law*, to take such action as will tend to restrict the spread of the disease. Such action will be largely educational,—reporting to and coöperating with the State Board of Health, in its "campaign of education" of consumptives and their friends and associates. I trust that you will also comply with that part of the law (Section 1, of Act 137, Laws of 1883,) which requires you to keep the "Secretary of the State Board of Health *constantly* informed" respecting cases of consumption in your jurisdiction.

I earnestly request that you comply with the law and make, each week, a report to this office (on blank "M," copies of which have been sent to you), and that you give any information which you may possess relative to the subject, which will assist this Board to perform the duties enjoined upon it by law, which are in part "The general supervision of the interests of the health and life of the citizens of this State."

Very respectfully,

HENRY B. BAKER,
Secretary.

* Kindly inform me promptly, if moved, where to, or whether dead or still sick.

The Secretary of this Board wrote to Arthur R. Reynolds, M. D., Health Commissioner of Chicago, on Jan. 20, 1894, and inclosed the printed slip relative to the action taken by the Michigan State Board of Health, for the restriction of consumption.* In his reply of Jan. 23, 1894, relative to the position this Board had taken for the restriction of tubercular diseases, Dr. Reynolds expressed himself as follows:—

"I am glad to get the slip enclosed with regard to consumption. It was my intention to communicate with you and ask you to furnish me with some printed matter that I understand you send to the physicians and families where Typhoid Fever, Consumption or other diseases supposed to be contagious exist, advising them of the steps to take to prevent contagion. If you have any such printed matter will you kindly mail me a sample of each.

"I congratulate you upon the stand you have taken in regard to tuberculosis. It has strengthened my hands in that direction very much, and will, I am sure, have the same effect upon those endeavoring to conserve the health all over our country."

The interest taken by Sanitarians of other States, in the work of the Michigan State Board of Health for the restriction of consumption, is shown in the following copy of a hektograph slip sent out from this Office, Dec. 6, 1894:—

RESTRICTION OF CONSUMPTION.

Michigan's Plan is being Quite Generally Followed.

Secretary Baker, of the Michigan State Board of Health, has recently received a letter from Doctor H. B. Horlbeck, who for many years has been the efficient Health Officer of Charleston, S. C., a prominent member of the American Public Health Association and a prominent sanitarian in this country, in which the hope is expressed that Charleston may follow the "good example set by the State of Michigan in attacking Consumption or Tuberculosis." In accordance with Dr. Horlbeck's request, Secretary Baker sent him such pamphlets, leaflets, copies of laws under which the work is being done in Michigan, and diagrams showing the result of a similar work which has been so successful in Michigan in lessening the number of deaths from scarlet fever. The information given Dr. Horlbeck related to Michigan's plan for the legal control of tuberculosis, and more especially for the restriction of the disease through the systematic and continuous education of the people most endangered—the relatives, friends and associates of consumptives.

OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH,
Lansing, Michigan, December 6, 1894.

Requests made for Publications of the State Board of Health Relative to the Restriction of Consumption.

Geo. H. Shibley, counselor at law, of Chicago, wrote to this Office, Dec. 8, 1894, requesting that printed matter used by the State Board of Health for the restriction of the dangerous communicable diseases, be sent to him, especially that relating to the restriction of consumption.

In response, the Secretary of this Board wrote, Dec. 11, 1894, and inclosed copies of publications mentioned in the letter, as follows:—

"DEAR SIR:—In accordance with your request of Dec. 8, I send you by mail today, in separate envelope a copy of the 'Public Health laws in force in Michigan in 1890', a copy of the proceedings of the Conference of Michigan Health Officers, a copy of the proceedings of the Sanitary Convention held under the auspices of the Michigan State Board of Health, at Menominee. They contain papers on Restriction of Consumption.

"I send you herewith a copy of the pamphlet on the 'Work of health officers and local boards of health', in which I have marked parts bearing on the subject of the control of tuberculosis, and have attached a slip which will give you the section of law under which this board has undertaken the legal control of the disease. The Michigan plan for the restriction of tuberculosis is similar to work so suc-

* A copy of this slip is printed on page 361, of the Annual Report of this Board for the year 1894.

cessfully carried out in the past for the restriction and prevention of scarlet fever, and provides more especially for a systematic and continuous education of the people most endangered by the consumptives.

"In exchange I shall be glad to have anything, newspaper slip or other publication, you may at any time have to spare bearing directly or indirectly upon any public-health subject."

December 12, 1894, Mr. Shibley wrote to the Secretary of this Board acknowledging receipt of letter and printed matter sent him. His communication was as follows:—

"Your favor of the 11th inst. at hand, enclosing copies of Instructions to Local Boards of Health, The Laws of Mich. Relating to Public Health, Proceedings and Addresses of Sanitary Convention, Proceedings and Addresses of the Second Annual Conference of the Health Officers in Mich., and leaflets pertaining to the restriction and prevention of consumption. Many thanks for the promptness and completeness with which you have complied with our request; will report later on the success with which we may meet in the legislature; possibly, however, the purpose can be accomplished through the State Board of Health, as appears to have been the method pursued in your State.

"Your papers on the restriction and prevention of consumption are most instructive, and it appears to me afford an unanswerable argument for placing consumption among the lists of communicable diseases. I cannot understand how it is that our Boards of Health in Illinois are so backward in this matter. In New York City I am told there are stringent regulations."

Subject of Consumption Studied in the Detroit High School.

May 16, 1894, Alice J. Lyon, teacher in the Detroit High School, wrote to the secretary of this board, as follows:—

"Will you kindly send about two hundred leaflets on consumption, for distribution to the present physiology class?"

May 19, 1894, the following reply to the above-quoted letter, from Alice J. Lyon, was sent from this office:—

"DEAR MADAM:—In compliance with your letter of May 16, I have sent you today by mail two hundred copies of the pamphlet on the Restriction and Prevention of Consumption, for distribution among your class in physiology.

"I am glad to see the interest you are taking in connection with public-health work. If I can be of further service to you it will give me pleasure."

Subject of Consumption given Special Consideration at the Meeting of the Michigan State Medical Society.

At the meeting of the Michigan State Medical Society, held at Lansing, May 3 and 4, 1894, special attention was given to the subject of tuberculosis. In the "Transactions" of the Society, for the year 1894, are published valuable papers on this subject by Drs. Gibbes, Wade, Shurley, Novy, and Baker, with discussions of the subject by other prominent members who were present.

The paper by Dr. Gibbes was entitled "The Pathology and Etiology of Consumption"; Dr. Wade read a paper entitled "Tuberculosis—Course and Varieties"; Dr. Shurley, "Treatment of Phthisis Pulmonalis"; these three papers were then discussed by members present. Dr. Novy read a paper entitled "Communicability and Prevention of Tuberculosis"; Dr. Baker read a paper on "The Relation of the State to Tuberculosis". These two papers were then discussed at length; the following members of the society taking part in the discussion: Drs. Shurley, Green, Bell, Vaughan, Baker, Georg, Wright, Gibbes, Dock, Cope, and Novy.

*Demand for a State Hospital for Consumptives.**

The following is a copy of a hektographed letter sent out from the Office of the State Board of Health, March 24, 1894. It shows the demand for a State Hospital for Consumptives:

"STATE HOSPITAL FOR CONSUMPTIVES.

"A short time ago the Secretary of the Michigan State Board of Health read a paper in which he advocated special hospitals for certain classes of consumptives. Now he is being inquired of relative to a *State Hospital* for consumptives. One letter is as follows:—

"'Now suffering from consumption, I write for what advice you may give me that will be of use to me in taking care of myself and preventing its spread. I had the Grip over two years ago, and a severe cold, and my left lung has troubled ever since. I have been told that there is a building being erected to be used as a Hospital for the care of consumption, free to all those that are not able to pay,—the State of Michigan to stand the expense. If there is such a place, I would like to be treated as soon as they are ready. Hoping to hear from you soon, I am, very respectfully.'

"Undoubtedly many lives could be saved in Michigan if poor persons suffering from this most dangerous communicable disease could be placed in a special hospital, where under well-planned rules and trained attendants the danger of spreading the disease shall be reduced to the minimum. The disease is spread in several ways, one of the chief being by the dust from the dried matter which is coughed up and expectorated, such infectious dust being breathed in by whoever comes within the area of the infection.

"A letter from a health officer reads as follows:—

"'Inasmuch as you have decided to put consumption in the category of contagious diseases (which ought to have been done long ago) I write for a little advice. We have a pauper of the township who has been afflicted with consumption for a year or two. The supervisor boards him at one of the hotels in the village of —— where he has the use of the sitting room, office and bar-room, as he is yet able to te around. Besides using the floors and cuspidors he is in the habit, most every morning, of standing on the porch and coughing up a half teacup or more of sputa and expectorating it upon the sidewalk. I have labored with him, the proprietors, and the supervisors to prevent such an exposure to others, but of no avail. I have tried to get the supervisor to send him to the County House, but don't succeed. What am I to do?'

"The Secretary of the State Board of Health estimates that there are in Michigan, in every year, about three thousand *new cases* of consumption, and that in each year about that number of persons die in Michigan from consumption. He believes that in each year possibly hundreds of these *new cases* might be prevented by such provision by the State as would care for a few hundreds of poor persons having consumption of the lungs, and who are now expectorating and scattering the seeds of consumption broadcast, to rich and poor alike, through hundreds of communities.

"If the State Legislature does not soon make such provision, perhaps some philanthropic millionaire may see in this proposition a useful service which he may easily do for the welfare and happiness of the people. The establishment of such a hospital for the *prevention*, as well as for the cure, of this disease which now causes the most deaths, would indeed be a noble act, and a grand monument to the memory of the founder."

HENRY B. BAKER,
Secretary."

"OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH,
Lansing, March 24, 1894.

Consideration of Consumption at the Second Annual Conference of Health Officers.

The Second Annual Conference of the Health Officers of Michigan, was held in Ann Arbor, June 14 and 15, 1894. At this meeting Prof. F. G. Novy read a paper entitled "The Cultivation and Staining of the Tubercle Bacillus"; Prof. V. C. Vaughan then followed with remarks on the "Detection of Tubercle Germs in Sputum by the Inoculation of Guinea Pigs", and gave demonstration of the same. Prof. E. A. A. Grange, State Veterinarian, read a paper entitled "The Usefulness of Tuberculin in Diagnosis, and the Interpretation of the Results of its Use". Prof. Novy read a paper on "The Communicability and the Prevention of

*This subject was considered at the meeting of the State Board of Health at Menominee April 6, 1894, and is mentioned on page xxxiii of the Annual Report for 1894.

Tuberculosis". Dr. Henry B. Baker gave an address entitled "The Restriction and Prevention of Tuberculosis". Dr. Robt. Johnston spoke on the subject of "The Disinfection of Public Buildings an Important Factor in Restricting Tuberculosis".

At the third session, the Conference took up the subject of the custom of health officers in reporting cases of consumption in accordance with recent action of the State Board of Health, each health officer being asked as to his individual practice regarding this subject. Personal responses were given which are here summarized as follows:—

Number of local health officers responding	39
Number not having reported such cases	26
Number who have reported the cases which have come under their personal observation	13

The reasons assigned for failure to report tuberculosis were various:—

1. Local physicians had not reported cases of tuberculosis to health officers in any locality heard from.

2. At Troy, Evart and Romeo, local health officers believe there are no cases of consumption in their jurisdiction at the present time.

All health officers who responded expressed a willingness to comply with the resolution of the State Board of Health and the State law. It was regretted that so few of the health officers of Michigan were present.

Dr. Baker, of the State Board of Health, stated how health officers may proceed in order to obtain reports of cases of tuberculosis from attending physicians.

Dr. A. R. Reynolds, Health Commissioner of Chicago, who was in attendance at this Conference, gave an unwritten address. He was afterwards requested to place his remarks in manuscript form and the following is his reply:—

"With reference to the stand which the State Board of Health of Michigan has taken relative to tuberculosis, I said at the Conference that I congratulated the State Board of Health upon the advanced stand they had taken with a view to controlling tubercular disease; that we in Chicago, and States throughout the west, were watching with great interest the outcome of their efforts, and that the Board should be loyally sustained by the local health officers and the physicians of the State; that the literature sent out in response to cases reported on the subject is an excellent means of educating the laity as to the dangers of tuberculosis, and could not in any way do anyone any possible harm."

Prof. C. A. Lindsley, M. D., of Yale College, President of the National Conference of State Boards of Health, and Secretary of the Connecticut State Board of Health, was requested to address the Conference and spoke briefly on the subjects under discussion. In closing his remarks, Prof. Lindsley spoke relative to the general interest felt in the work undertaken for the restriction of tuberculosis, as follows:—

"Knowing that you were to discuss tuberculosis and the means of restricting its ravages, at this Conference, we felt a deep interest in your deliberations, and our State Board was very glad to accept your kind invitation to send delegates to your meeting. Dr. Wordin and myself were honored with the duty of attending here to-day in that capacity, and to bring back to Connecticut such information and encouragement for like effort as we might be able to find here."

Dr. Henry B. Baker, Secretary of the Michigan State Board of Health, in an address on "The Restriction and Prevention of Tuberculosis" spoke to the Conference on the subject of "A Plea for a State Hospital for Consumptives", and closed his remarks by presenting the following resolutions, which were unanimously adopted by the Conference:—

Resolved, That it is the judgment of this Conference of Health Officers and other delegates of Michigan Boards of Health, that "consumption (and other diseases due to the *Bacillus tuberculosis*) should be included in the list of 'Diseases dangerous to the public health,' referred to in sections 1675 and 1676 Howell's Statutes, requiring notice by householders and physicians to the local health officer, as soon as such a disease is recognized."

Resolved, That we recognize the following facts:

1. That tuberculosis is the most grave and fatal disease now affecting the health and lives of the people of this State, destroying about three thousand lives per year;
2. That this disease orginates principally by transmission from man to man or from man to animals and again to man;
3. That the spread of this disease can be best arrested by the disinfection of the sputa and other discharges, by special supervision of those infected, and by the care of such persons under conditions which will prevent the transmission of the disease to others;
4. That such disinfection and supervision can not be carried out in the crowded houses of the poorer classes; and
5. That, under conditions which will prevent re-infection, many consumptives may be permanently cured, and returned to their homes and work, educated in the methods of restricting the disease. In view of these facts;

Resolved, That this Conference, by its officers, respectfully memorialize the next Legislature for an appropriation sufficient for the purpose of building, equipping and maintaining a State Hospital for Consumptives.

Resolved, That the planning, construction and equipping of the State Hospital for Consumptives may well be entrusted to the State Board of Health.

Resolved, That the location of the Hospital should be such that it may be accessible by railroad to the thickly-settled parts of the State, and such as to permit of out-door exercise and light out-door labor whenever the weather will permit.

Resolved, That although consumption is the most dangerous communicable disease, a hospital can be so planned, equipped and managed as that it shall not seriously endanger the neighboring inhabitants; and as it is desirable that it shall contribute the largest amount of sanitary education to the teachers and to the people of the State, therefore,

Resolved, That it is the judgment of this Conference that the proposed State Hospital for consumptives should be located at the seat of the State University at Ann Arbor, in order that it may afford the best opportunities for the observation and study of this most important disease, in conjunction with the investigations now being so satisfactorily pursued in bacteriology and other departments of sanitary science, at the State Laboratory of Hygiene.

Resolved, That this Conference hereby respectfully memorializes the Legislature of Michigan at its next session to take such action as will result in a knowledge of the extent to which the dairy cattle and other animals supplying milk, meat or other food products to the people of Michigan are infected with tuberculosis. Also that it take such action as will tend to stop the spreading of tuberculosis among animals, and from animals to man.

Request for Information Relative to the Method of Reporting Cases of Consumption.

J. F. Suydam, health officer of Alma village, Gratiot county, wrote to the Secretary of this Board, Feb. 24, 1894, asking for information relative to method of making reports of cases of consumption. His inquiry was as follows:—

"Do you wish me to visit, each week, cases of consumption, in order to report each Saturday? How am I to receive compensation for the same? I report case that died last Monday. I presume there are more than this one case in the village when my attention is called to them. You might send some more pamphlets on consumption."

The following reply to the above-quoted letter was sent from this Office, March 3, 1894:—

"Perhaps you can receive reliable information each week relative to certain cases of consumption in your jurisdiction without making a personal visit to the family in which the case is, so as to enable you to make the weekly reports to this office.

"Unless the local board of health has made provision for your remuneration, the law provides that you shall receive *not less* than two (2) dollars per day for your services, to be paid by the village. (See Sec. 3, Act 137, Laws of 1883.)

"Premises where a case of Pulmonary consumption has been, which has recovered, died or moved away, should be disinfected in the same manner as if the disease had been any other which is 'dangerous to the public health.' I trust that disinfection will be done in the premises where you report one case as having died."

Correspondence Relative to the Shipment of Bodies Dead of Consumption.

W. T. Dodge, M. D., of Big Rapids, Mecosta county, Michigan, telegraphed the Secretary of this Board, April 23, 1894, as follows:—

"Have given certificate permitting shipment of body that died of consumption. Is that right?"

The Secretary of this Board supposing the telegram to be from Dr. Dodge, of Morley village, wrote to him April 24, 1894, as follows:—

"Your telegram of April 23, was received, and I should have answered it sooner had I supposed it was necessary. I supposed if you had given your permit for shipping body dead of consumption, that ended it.

"In the permit which you gave, if you certified that the body was dead of a non-contagious disease, you certainly were wrong.

"You did not say whether the body was a disinterred body, or one recently dead. If a disinterred body I wonder that the railroads would take it, as their rules (a copy of which I send you herewith) provide that bodies shall not be accepted for transportation unless such removal has been approved by the State Board of Health. Under such circumstances I require the permit of the health officer of the locality *to which* and from which the body is to be shipped, the certificate of the cause of death by the attending physician, and assurance that the body shall be prepared in accordance with Section 6 of Rule 52 of the General Baggage Agents' Rules.

"If the body was only recently dead, the permit of the health officer of the place to which the body is to be shipped should have been in possession of the one who shipped the body, or he may be subject to prosecution. The body should have been prepared in accordance with Section 2 of Rule 52, to be in accordance with the requirements of the National Association of General Baggage Agents. Consumption is a disease dangerous to the public health, and would come under Section 2. Consumption is a communicable disease."

April 26, Dr. W. T. Dodge, of Big Rapids, wrote in answer to the above-quoted letter from this office, as follows:—

"Your letter of the 24th inst. has been forwarded to me from Morley. I did not give a certificate in the capacity of Health Officer, but as attending physician. The corpse was that of a prominent member of the K. of P. lodge of this city, and I was there with the members of the lodge to attend his funeral and send the remains to Detroit. They found difficulty in getting the company to accept the corpse for shipment, and as attending physician I signed the certificate in question and procured the signature of the President of the Board of Health. I did not believe that the State Board of Health had taken the position that Consumption might be communicated through the shipment of a dead body and so wired you for information. As you did not reply I had sufficient influence to procure the shipment of the body. I have considered your efforts to call the attention of the people to the possibility of consumption being communicated by means of the sputa as highly commendable, but when you go so far as to class that disease in the same category as scarlet fever, diphtheria, small-pox, etc., and place the same restrictions around the shipping of bodies dead of that disease as you do of the others, I think you will have much difficulty in securing the support of the profession. It is the height of absurdity in my opinion to claim

that consumption is contagious in that sense, and such a contention will only tend to lessen the chances of people giving any attention to your other and reasonable regulations.

"It would be highly interesting to have you or some of the distinguished members of your board explain in what way the disease can be communicated by a body in a coffin or in what way the disease can be considered contagious except by means of the sputa.

"I may say that the health authorities at Morley are not medical men and I assumed full responsibility for the shipment of the body in question. When your board make reasonable and common sense regulations I shall support you to the extent of my ability, but I shall not subscribe to the declaration that consumption is contagious except in a limited degree, and I shall hold to the opinion that the disease cannot be communicated by means of a dead body."

April 27, 1894, the Secretary of this Board wrote to Dr. Dodge in answer to the above-quoted letter, as follows:—

"DEAR DOCTOR:—Accept thanks for your letter of April 25. I am very glad to have your views on the subject, because it is the most important subject with which this Board has to deal. I do not think there would be much difference between your views and mine if we could talk the subject over. I notice however, one point near the close of your letter from which I presume you would recede, because it has been demonstrated to be the other way. I refer to your closing sentence—'The disease cannot be communicated by means of a dead body.' In Vol. II, Stevenson and Murphy's Hygiene, Dr. E. Klein refers to investigations by Schottelius (Centralblatt für Back. and Parasit., VII. 9,) which proved that tubercle bacilli from lungs *buried for years* still possessed the capability of producing artificial tuberculosis. We know that diphtheria is spread by the dried sputa, in a manner similar to the spread of tuberculosis. We also know that diphtheria is *frequently spread* by permitting corpses to be viewed. How it is possible for the minute particles which remain about the face to float off, be inhaled and cause the disease is perhaps as difficult for me as it is for you to appreciate, but that it does so seems to be absolutely proved in many instances. The reproduction of the tubercle bacilli is slower than the diphtheria bacilli, but the tubercle bacilli are the most resistant—not so easily destroyed."

In consumption, the period of incubation is so long that it is going to take a long time to collect a sufficient number of instances of the actual spread of consumption by corpses of consumptives to establish the fact in that manner; but if "culture tubes" are successfully inoculated with tubercle bacilli from the invisible remains of dried sputa on the lips or faces of consumptive corpses, this ought to be enough to establish the fact of there being danger.

A question of a possible relation between Tubercular Diseases and Cancer of the Breast.

The following is a copy of a hektographed letter sent out from this Office, March 23, 1894, calling attention to the frequent occurrence of cancer of the breast in tubercular women, as observed in the practice of N. D. Yale, M. D., of Deerfield, Michigan:—

IS THERE A TUBERCULAR DISEASE SOMETIMES REPORTED AS CANCER OF THE BREAST?

On this subject, N. D. Yale, M. D., Deerfield, Michigan, in a letter dated March 21, 1894, says: "Within my observation and within a radius of one-half mile, and residing on farms, hence practically isolated, I have known three men to have consumption, and die from it. Afterward their wives became afflicted with 'cancer of the breast'. Two have died and the remaining one will soon.

"Was this accidental? The families were not very intimate, and I do not think contagion was carried from one to the other.

"In each instance the women were of good families and strong and of excellent physical appearance at the time of their husband's death."

I have replied to Dr. Yale:—

"Careful investigation ought to answer the question. Relative to two of the cases you mention it is now too late, but it would be of great interest to have the remaining one, which is still living, carefully

examined, by some competent microscopist, to learn whether or not the *Bacillus tuberculosis* is present in the alleged 'Cancer of the breast'. Can you not get Prof. Gibbes, of the University, or some other microscopist there, sufficiently interested in the subject to investigate this case? I will write to Prof. Vaughan, who is a member of this Board, perhaps he may undertake to aid in this investigation.

"If you do succeed in having an investigation, I shall be glad to be informed of the results."

Very respectfully,

HENRY B. BAKER,
Secretary.

OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH,
Lansing, Michigan, March 23, 1894.

April 16, 1894, Dr. Yale wrote to the Secretary of this Board again, as follows:—

"DEAR SIR:—I have no objection to the publication of the query in note enclosed regarding consumption and some forms of 'cancer'. My cases were quite likely *singular coincidences*. But I add another. I have another patient who came to me since writing you, with cancer of the left breast, developed too far to make amputation advisable—glands in the axilla greatly enlarged. She is a niece of one of the consumptives referred to, and was with her uncle much, and also with the aunt, and helped to 'lay out' the aunt after her death. This is probably another *coincidence*. Still I would like to have the profession take up the inquiry and investigate it fully.

"I believe lupus is tubercular. If tubercle attacks the skin, why may it not attack glands, as the breast.

"From the living cancerous patient I could obtain the discharges for microscopic investigation, but doubt if I could obtain any of the tissues of the breast, as she is a very timid person. If the discharge does not contain the tubercle bacillus the disease is not contagious and I would have very little interest in it.

"I have hesitated about the publication of the cases because I would avoid anything like notoriety. But if the journals care to take the matter up and ask other physicians what their experience is, I shall not object."

In answer to the above-quoted letter from Dr. Yale the following was sent from this Office, April 19, 1894:—

"DEAR DOCTOR:—Please accept cordial thanks for your very interesting letter of April 16, relative to cases of cancer of the breast. In accordance with your permission, I will have a copy of your letter made and together with the hektographed page on the same subject, sent to the editor of the American Lancet of Detroit." (Sent April 19, 1894.)

AGES OF GREATEST PREVALENCE OF, AND MORTALITY FROM, CONSUMPTION*.

In Table 8 are shown the numbers of cases and deaths from Consumption in Michigan in 1894, in which the ages were stated in the health officers' reports. In this table the cases and deaths are arranged in *age groups*, showing what per cent the cases in each group were of all cases; the per cent that the deaths in each group were of all deaths; the per cent the deaths in each group were of the cases in that group, and the per cent the deaths in special groups were of all deaths.

*In compiling data relating to ages, used in tables in this article, where the ages are stated, as they usually are, in full years, the cases, or deaths, are compiled under the years mentioned. When the ages are stated in months, or years and months the following method is pursued:—Persons under one year and six months old are classed as aged *one* year. Those over one year and six months and under two years and six months are classed as aged *two* years. Those over two years and six months and under three years and six months are classed as three years of age, and so on for each year.

In dividing the ages into five-year periods, the first period consists of all ages from birth to five years and six months. The second five-year period includes all ages over five years and six months and under ten years and six months. The third five-year period includes all ages over ten years and six months and under fifteen years and six months; and in each succeeding period the same arrangement is followed.

TABLE 8.—*Exhibiting in certain Age-groups, the number of cases and the number of deaths from Consumption; the per cent that the cases in each group were of all cases; the per cent that the deaths in each group were of all deaths; and the per cent that the deaths in each group were of the cases in that group.—Compiled from all reports for the year 1894 which stated the ages.*

Ages in groups of years.	Number and per cent of Cases and Deaths in certain Age-groups.*															
	All known ages.	10 years and under.	10 to 15.	15 to 20.	20 to 25.	25 to 30.	30 to 35.	35 to 40.	40 to 45.	45 to 50.	50 to 55.	55 to 60.	60 to 65.	65 to 70.	70 to 75.	75 years and over.
No. of cases	† 387	11	11	57	51	61	53	36	28	11	16	11	15	15	7	4
Per cent the cases in each group were of all cases of known ages	100	2.8	2.8	14.7	13.2	15.8	13.7	9.3	7.2	2.8	4.1	2.8	3.9	3.9	1.8	1.0
No. of deaths	† 255	7	9	44	38	39	29	22	20	5	8	6	8	12	4	4
Per cent the deaths in each group were of cases in that group	65.9	63.6	81.8	77.2	74.5	63.9	54.7	61.1	71.4	45.5	50.0	54.5	53.3	80.0	57.1	100
Per cent the deaths in each group were of all deaths at known ages	100	2.7	3.5	17.3	14.9	15.3	11.4	8.6	7.8	2.0	3.2	2.4	3.2	4.7	1.6	1.6
Per cent the deaths in special groups were of all deaths at known ages		6.3		47.5			27.8			18.4						

* Method of grouping is stated in footnote to the sub-head under which this table appears.
† Does not include those cases or deaths where the age was not stated.

TABLE 9.—*Exhibiting, by Sex, the Ages of 253 persons who died of Consumption, during the year 1894. (Compiled from such reports to the State Board of Health, as stated Sex and Age.*)*

Age at Death.	Males.	Females.	Totals.
10 years and under	5	2	7
10 to 20 years	14	39	53
20 to 30 "	33	44	77
30 to 40 "	20	31	51
40 to 50 "	13	12	25
50 to 60 "	8	6	14
60 to 70 "	6	14	20
70 to 80 "	3	3	6
Over 80 "	2	0	2
	104	151	255

* Method of grouping is stated on page 439.

TABLE 10.—*Exhibiting, by Sex and in certain Age-groups, the per cent of persons who died from Consumption in Michigan, during the year 1894; also the average age at death, and the number of deaths included. (Compiled from such reports as stated the ages.)*

Deaths from Consumption.													
Year.	Sex.	Average age, Years.	No. of Deaths included.	Age.—In Periods of Years. Per Cent of Deaths in each Period of Age.*									
				All ages.	10 years and under.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	Over 80 years.
1894.	Males	34.7	104	100	5	13	32	19	13	8	6	3	2
	Females	32.7	151	100	1	26	29	21	8	4	9	2	0

* Method of grouping is stated in footnote to the sub-head under which this table is printed.

From Tables 9 and 10, it may be seen that there were 47 more deaths reported from consumption among females than among males during the year 1894 (in the reports where the sex was stated).

Table 10 shows that the highest per cent of deaths for each sex occurred in the age-period from 20 to 30 years. The average age at death was two years more (34.7) for males than for females (32.7).

AVERAGE DURATION OF CONSUMPTION.—FATAL AND NON-FATAL CASES.

Fatal Cases.

TABLE 11.—*Exhibiting by Sex of Patient, the duration in months and years of fatal cases of sickness from Consumption, in Michigan, during the year 1894. Arranged in time-periods. (Compiled from those reports which stated the length of time the patient was sick.)*

Fatal cases of Consumption.																				
Year.	Sex.	No. of cases included.	Duration of Sickness:—Per cent of Deaths in each Period.																	
			All cases.	1 Month.	2 Months.	3 Months.	4 Months.	5 Months.	6 Months.	7 Months.	8 Months.	9 Months.	10 Months.	11 Months.	1 Year.	1 to 2 Yrs.	2 to 3 Yrs.	3 to 4 Yrs.	4 to 5 Yrs.	Five Years and over.
1894.	Males	44	100	9.1	9.1	2.3	4.5	9.1	4.5	2.3	11.4	9.1	6.8	0	4.5	15.9	6.8	0	2.3	2.3
	Females	88	100	4.5	5.7	11.4	4.5	8.0	6.8	6.8	2.3	9.1	1.1	6.8	9.1	10.2	3.4	8.0	1.1	1.1

From Table 11, it may be seen that of the 44 males who were reported to have died from consumption in 1894, and of which the interval between the time of being taken sick and the time of death was given, 73 per cent died in the first year of sickness; 15.9 per cent in the second (1 to 2) year of sickness, and 11.4 per cent died after being sick over two years. Of the 88 females reported as having died in 1894, 76.1 per cent died in the first year of sickness; 10.2 per cent in the second (1 to 2) year of sickness; 11.4 per cent in the third and fourth (2 to 4) years of sickness, and only 2.2 per cent after the fourth year.

The average duration of the fatal cases, in 1894, was 11.5 months for males and 13.02 months for females.

Non-Fatal Cases.

TABLE 12.—*Exhibiting by Sex of Patient, the Duration in months and years, of Non-Fatal cases (still sick) of Consumption, in Michigan, in the year 1894; as stated in the reports to the State Board of Health.*

Non-Fatal cases of Consumption.																				
Year reported.	Sex.	No. of cases included.	Duration of ness:—Per cent of Cases in each Period.																	
			All periods.	1 Month.	2 Months.	3 Months.	4 Months.	5 Months.	6 Months.	7 Months.	8 Months.	9 Months.	10 Months.	11 Months.	1 Year.	1 to 2 years.	2 to 3 years.	3 to 4 years.	4 to 5 years.	10 to 12 Yrs.
1894.	Males	22	100	4.55	4.55	4.55	0	9.09	4.55	4.55	4.55	4.55	0	4.55	9.09	22.73	9.09	9.09	0	*4.55
	Females	14	100	7.14	21.43	0	0	7.14	0	0	21.43	0	0	7.14	7.14	21.43	0	0	†7.14	0

* One case was reported as having been sick from 10 to 12 years.
† One case was reported as having been sick from 4 to 5 years.

In Table 12 it may be seen that in non-fatal cases of consumption reported in the year 1894, of the 22 males, 54.6 per cent had been sick for one year or less; 22.7 per cent were then in the second year (1 to 2) of the disease, and 22.7 per cent had been sick from 2 to 12 years. Of the 14 cases among females, 71.4 per cent had been sick for one year or less; 21.4 per cent were then in the second year of the disease, and 7.1 per cent had been sick between four and five years.

The average duration of sickness was: In males 19.1 months, in females 11.6 months.

CASES OF CONSUMPTION REPORTED AS HAVING RECOVERED.

In the reports relative to consumption received at this office during the year 1894, eleven cases were said to have recovered from the disease; below is given in a condensed form information relative to these cases:—

Sex.	Age.	Duration of Sickness.
Males	14 years.	Not stated.
	18 years.	7 months.
	27 years.	4 months.
	Not stated.	3 years and 10 months.
Females	21 years.	2 years and 8 months.
	19 years.	5 months.
	25 years.	3 months.
	Not stated.	1 year.

Sex, Age and Duration were not stated in three of the cases reported as having recovered.

The average age of the three male cases, where the ages were stated, was 19.7 years; of the three female cases, 25 years.

The average duration of sickness was for males 1 year and 7 months; for females 1 year and 1 month.

TUBERCULOSIS IN CATTLE.

A Suspected Herd, at Tecumseh, Michigan, Tested by Tuberculin.

June 20, 1894, the Secretary of the State Board of Health wrote to Dr. John F. Jenkins, of Tecumseh village, Lenawee county, and to Dr. Frank Andrews, health officer of the city of Adrian, as follows, relative to tests for tuberculosis made in a herd of cattle in the city of Adrian:—

"DEAR DOCTOR:—The newspapers contain an account of a cow killed at Adrian which proved to be tuberculous, also of the examination of other animals by means of tuberculin which reacted; but, after the animals were killed, no tubercular disease was found. I understand that these tests were made by a Mr. Waldron of Tecumseh. I am not informed whether or not he is an expert veterinarian. Expert ability is required for the reliable testing for tuberculosis by means of tuberculin. If practicable, without much trouble, I wish you would investigate the suoject, and ascertain just how the tests were made; where he got his tuberculin; just what the rise of temperature was in each case; whether or not Mr. Waldron is considered an expert veterinarian; and any other facts bearing upon the subject. Was any other disease than tuberculosis, found in the animals which reacted to tuberculin?"

In reply to the above-quoted letter, Dr. Jenkins wrote, June 25, 1894, as follows:—

"DEAR DOCTOR:—I have deferred writing you from the fact that I have been unable to see Mr. Waldron until today on account of his living about a mile out of town. He states to me that he is going to report to you the results of his post-mortem examinations, and hence it will be unnecessary for me to make any statement in reference to the matter.

"I think that Waldron is pretty well up in his profession, being a graduate of a Philadelphia veterinary college, and last winter he took a post-graduate course in New York.

"I will merely state that he used Koch's tuberculin in the cases referred to in your letter, and that reaction took place in both cases, although in one case no tubercular deposits were found upon post-mortem examination, which I should not regard as proof that tubercle did not exist.

"I think that a man named Clark, in Clinton, has cattle infected with tubercle, and that the State veterinary surgeon has not properly looked after the cases."

Doctor Andrews, health officer of the city of Adrian, answered the above-quoted letter from this Office, June 22, as follows:—

"DEAR DOCTOR:—Yours of yesterday received this morning, as I was about writing you all the information I could obtain. Dr. Chas. Waldron is a graduate of Penn. College of Veterinary Medicine of Philadelphia, and spent one year in New York after graduating and practicing for a number of years, and is accounted an expert. The tests were carefully made and a record kept of each case for 13 hours afterward. I have examined the records and find that the temp., pulse and respiration were taken before injection of tuberculin and at the time of making, also 8 hours, 10 and 13 hours afterward. The cow with tuberculosis was bought 5 years ago by C. E. Weaver of this city from ex-Senator Palmer of Detroit.

"The cow of Mr. Mason, whose temperature rose to 106.2, pulse 84, respiration 44, eight hours after the injection, was killed and examined carefully by Drs. Waldron and Slack, veterinarians, and by Daniel Todd, M. D., of this city, and pronounced to be perfectly healthy in every way. One other cow (suffering from diarrhœa), temp. rose to 105.2 but in 13 hours was normal. Any information that you wish will be cheerfully and gladly given by John G. Mason, who owns the herd and who is very much interested, in making the trials to find out whether they have tuberculosis or not. I am credibly informed that John T. Clark of Clinton, Mich., has lost eight from this trouble, and is keeping it quiet. I enclose cutting from last evening's paper. Any other information will be cheerfully furnished."

The newspaper clipping mentioned in Dr. Andrews' letter read as follows:—

"MR. EDITOR:—Many stories have been circulated that I had 'Tuberculosis' in my herd of fine Jerseys. I take this means of setting at rest all stories concerning the same, many of which have been without any foundation whatever.

"The facts are, that, on or about the 5th day of June, I sold a cow belonging to another man of this city for beef. She was killed at Mr. R. W. Boyd's slaughter house a few days after, and found to have the disease in a very bad form; so bad, in fact, that her meat was not fit for sale or use. Of course this naturally frightened me somewhat, and I took immediate steps to ascertain, if possible, whether it was in my herd or not. For that purpose I employed Dr. Chas. Waldron, V. S., of Tecumseh, to examine my herd thoroughly, with instructions if any suspected cases were found, to slaughter them at once, and make a careful post-mortem examination. But two suspected cases were found, the worst of which I immediately slaughtered, and caused a careful post-mortem examination to be made. The post-mortem revealed a perfectly healthy condition of the cow.

"The inspection of my herd was made by Dr. Waldron, with the 'Tuberculin test,' at present much used in the State of New York, by the State board of health. When Dr. Waldron had finished, he pronounced my herd free from the dread disease. I further gave Dr. Waldron instructions to carefully inspect my herd at any time, with orders, if any animals were found suffering from the disease, to kill them at once, and examine the same.

"Having taken all the precaution necessary in the matter, and finding nothing of the trouble, I feel perfectly safe in refuting all stories concerning the same.

"Tuberculosis is a very unhealthy and contagious disease, especially to those using milk in their own families. I would ask all dairy men to carefully look after this, in their own herd.

"J. G. MASON."

June 22, 1894, the Secretary of this board wrote to Hon. H. H. Hinds, President State Live Stock Commission, relative to the alleged presence of tubercular cattle among the herd belonging to John T. Clark of Clinton, Lenawee county. The communication was as follows:—

"I am informed by a health officer that John T. Clark of Clinton has lost eight cattle from tuberculosis, and is keeping it quiet."

Pres. Hinds wrote, June 25, in answer to the above-quoted letter from this office, as follows:—

"Referring to your letter of the 22nd on subject of alleged cases of Tuberculosis at Clinton,—When in Washington a few days ago, I saw in a Michigan paper that some experiments with tuberculin had been carried on near Adrian and no cases were found. Has that report and the one now before me any connection? Who is the health officer that makes this report and does he claim any cases now on hand?"

The Secretary of this Board wrote to Pres. Hinds, June 26, in answer to the above-quoted letter, as follows:—

"DEAR SIR:—Replying to your letter of June 25, I do not know whether or not there is any connection between the reported tuberculosis at Clinton and at Adrian. It was reported that the tuberculosis at Clinton was in the herd of John T. Clark, and I understand that the tuberculosis at Adrian was in the herd of a Mr. J. G. Mason and C. E. Weaver.

"I have written the health officer of Clinton for facts relative to the alleged tuberculosis in the herd of John T. Clark, and will inform you when I hear from our health officer."

On the same day (June 26) that the above-quoted letter was sent to Pres. Hinds, the following letter was sent from this O
D., health officer of Clinton village, as fo

"Reliable information reaches this office that J.
from tuberculosis, and is keeping it quiet.

"Enclosed find stamped envelope for your reply. I should be glad to have what information you may now have, or may be able to obtain, relative to the truth of the above, how it is known to be tuberculosis, whether tuberculin has been used, whether more of his animals are affected, etc."

Dr. White replied to the above-quoted letter, June 27, as follows:—

"In reply to your inquiry concerning J. T. Clark's herd, I am unable to find that he has lost any cattle by tuberculosis lately. Although he has some animals which are suspected. At least one which has existed for several years, and was seen by the Commission, sent here to investigate several years ago."

The following interesting report of tests made on cattle, suspected of being tubercular, was sent to this office June 27, 1894, by Chas. A. Waldron, veterinary surgeon, Tecumseh, Mich.:—

"DEAR SIR:—I send you a report of the cattle that I tested with tuberculin. The test was made June 16-17. I commenced in the morning, which was very warm, the thermometer registered nearly 100 in the shade at the time of injection, but we had a heavy shower before the 8 hour test, which lowered the temperature a good deal, but did not materially affect the cattle. After the examination of the morning they were allowed to pasture until 11 A. M. when we commenced taking their temperature, pulse, and respiration, and also gave the injection of tuberculin which was placed under the skin over the left scapula, first sponged the part thoroughly with a 1-30 solution of carbolic acid. In some there was great swelling around the point of injection, while in others there was no perceptible effusion. Wherever we had a rise of temperature we had more swelling. I think it would be easier to give the injection about 6 P. M. so as to commence taking the temperature in the morning, that is if the days are not too hot, as that would not make a night job of it.

"I obtained my tuberculin from Schulze, Berge and Koechl, New York. I made a 10 per cent solution with pure water, with one-half per cent of carbolic acid in it. Injected 40 minims of this solution, which gave each animal 4 drops of the tuberculin as near as I can figure. They all received the same amount, and under the same conditions. Now about the reaction—temperature: In cow No. 7, I chose her for post-mortem because she had the highest rise of temperature, a trifle over 4 degrees. She was to all appearance in perfect health, neither could I find anything in post-mortem, that would sustain my diagnosis of tuberculosis.

"Dr. Todd, an M. D. of Adrian, was present at the post-mortem and he was emphatic in his opinion that we had found no tuberculosis; so I had to give as my opinion that we had found none.

"(But the lymphatics in the base of the lungs and in the liver were not right. There were also specks in the lungs and liver, but because none of these had become calcareous they would not listen to it that they were anything wrong [abnormal]. I should have had them examined by an expert but did not like to stand too much expense, but I see by the report you sent me, that Dr. Vaughan would gladly do it for a reasonable compensation.)

"I think that No. 21 would have given us a more positive result as her general appearance was not so good and she was the only one I had any doubt but what was healthy, from a physical examination on the morning of the 16th.

"I have held a great many post-mortems on cases where I was able to make a physical diagnosis and so I was somewhat disappointed when this case gave negative results. But I shall test this herd again next fall.

"I suppose you have the report of the cow that was slaughtered for beef, which was with the Mason herd for some time. I examined her lungs, heart and liver; she was very bad off, although very fat and nice to all appearances which shows what danger we are constantly in.

"I held a post-mortem on a bull 4 years old (the last calf of this cow) which had been suffering for nearly a year, so I was told, from an abcess on the side of his head which had extended from the base of the horn (which, by the way, was sawed off about a year ago) down the lymphatics of the neck to the lungs and heart. It would have killed him in a short time if we had not. Now doctor I have made this too long but must use as my excuse that I am very anxious about this tuberculin test as a diagnostic

here is anything you wish of me let me know, or any suggestions to make I am ready

no tuberculosis or any symptoms of it in the bull."

Test for Tuberculosis in a Herd of Jersey Cattle belonigng to J. G. Mason (Tuberculin test made by Chas. A. Waldron, V. S., Tecumseh, Mich.)

Animal—	No.	Temperature before injection.—7 A. M.	Temperature at time of injection.—11 A. M.—12:45 P. M.	Temperature 8 hours after injection.	Temperature 10 hours after injection.	Temperature 12 hours after injection.	Temperature 14 hours after injection.	Temperature 18 hours after injection.	Pulse at time of injection.	Pulse 8 hours after injection.	Respiration at time of injection.	Respiration 8 hours after injection.
Cow—	1	102.2	103 2	102.6	102.7				77	68	44	64
"	2	102.0	103.0	102.2	101.6				52	68	56	68
"	3	102.6	104.0	102.6	102.6				69	72	48	48
"	4	102.2	102 8	102.8	102.8				60	52	48	60
"	5	101.2	103.2	104.2	103.6				84	88	40	48
"	6	102.2	103.2	102.6	102.6				68	80	56	32
Killed—	7	100.4	102.0	104.4	105.6	106.2	106.0	105.2	52	84	64	44
Cow—	8	101.8	103.0	101.8	102.2				68	68	88	56
"	9	101.0	102.2	102.2	102.0				64	96	32	60
"	10	101.6	103.0	103 5	103.0				64	60	48	72
"	11	102.3	101.0	101.0	102.4	101.6			72	64	48	70
"	12	101.6	102.8	103.0	103.0				92	60	40	48
"	13	102.3	102.6	103.2	103.4	104.0	102.0		80	60	56	56
"	14	102.6	102.8	102.8	103.2	102.6			84	48	44	64
"	15	101.8	102.6	102.6	102.4				80	52	80	48
"	16	102.6	102.6	102.6	104.0	103.0	102.0		72	64	48	44
"	17	102.0	102.4	102.8	101.8				76	84	44	52
"	18	102.0	102.4	102.8	102.4				84	64	44	44
"	19	102.2	103.4	102.8	101.6				60	60	52	48
"	20	102.0	102.0	102.8	102.8				56	64	56	64
"	21	102.0	102.6	105.2	106.2	106.0	105.2	103.0	65	80	52	64
"	22	101.8	102.4	103.4	103.4				80	80	56	44
"	23	102.2	103.0	103.2	103.0				64	64	52	48
"	24	102.2	103.0	103.4	104.2	102.4			68	80	68	44
"	25	101.8	103.0	102.6	102.2				60	68	52	22
"	26	102.2	102.2	103.4	103.0	102.0			72	64	64	56
"	27	101.8	102.2	104.4	104.4	103.2			68	68	56	48
Bull—	28		101.5	102.6	102.6	101.0			64	56	52	44
Bull calf—	29		101.8	101.4	101.0	101.0						
" "	30		103.6	103.4	103.0	102.6						

June 16-17, 1894.

C. A. WALDRON, V. S.,
Tecumseh, Mich.

ERYSIPELAS IN MICHIGAN IN 1894.

During the year ending December 31, 1894, two special reports of outbreaks of Erysipelas were made to the Secretary of the State Board of Health. One case reported from Cheboygan City, by Dr. W. F. Reed, Health Officer, was taken sick May 7, and occurred in the person of a male aged 56 years. The other case, reported from Sutton's Bay Tp. Leelanaw Co., by Dr. W. M. Payne, Health Officer, was taken sick September 14, and occurred in the person of a female aged 45 years.

An inspection of Exhibit IV, page 91, of this report, will show that a smaller per cent (13) of weekly reports, showing prevalence of erysipelas in Michigan, was received at this office during 1894 than in any other year during the period from 1882 to 1894 inclusive. The highest per cent (26) being in 1884. Further inspection will show that the prevalence of this disease has gradually decreased until it reached, in 1894, one-half its prevalence of 1884, and nearly one-half since 1888.

Erysipelas is a dangerous communicable disease. It is gratifying to know that it is not increasing in Michigan.

DISINTERMENT AND REMOVAL OF DEAD BODIES.

During the year 1894, communications relative to the removal of dead bodies were received at the Office of the Secretary of the State Board of Health, from seven localities. The substance of the correspondence relative to said removals is as follows:—

Proposed Removal of Dead Body from Otisco Township, Ionia County.

About Jan. 9, 1894, Wm. Bell, M. D., health officer of Otisco township, Ionia county, wrote to this Office as follows:—

"Man died at Belding some three months since of diphtheria. Buried within my jurisdiction. Family wish to remove the body some thirty miles across the country in private conveyance, etc. What is the duty of the Health Officer?"

In reply to Dr. Bell's letter, Jan. 9, 1894, the Secretary wrote:—

"Replying to your question relative to the removal of the body of a man dead of diphtheria who is now buried in your jurisdiction,—I do not think that the body ought to be removed at this season of the year, because diphtheria is then most liable to be spread. I should not advise you to give your permit for the disinterment and removal of this corpse.

"If you should give your permit and the body is removed, the greatest possible care should be taken that the disease of which this man died is not spread. No child, or other person not absolutely needed in performing this interment and removal, should be present; and no grave-digger or other person who is present, should go near a child until after he has had a thorough change of clothing, a thorough bath, and then

not during the existence of any sore throat which may have been contracted during such an occasion. I would recommend that the body be prepared in accordance with Section 6 of Rule 52 of the General Baggage Agents' Rules, a copy of which I send you herewith.

"I also send you herewith a copy of an Abstract of the Meeting of this Board, Oct. 23, 1888, in which I have marked parts bearing upon precautions which should be observed in exhuming dead bodies.

"You say that the body is to be moved across the country. If this is the case the permit of the health officer of every jurisdiction into which and through which, the corpse is to pass, must be obtained. In violation of such law, a severe penalty is provided, in certain cases.

"I sincerely hope this corpse may not be removed before June of this year."

Proposed Disinterment and Removal of a Dead Body from Erin Tp.

Mar. 4, 1894, James Yates, M. D., health officer of Erin township, Macomb county, wrote to the Secretary of this Board as follows:—

"In my report to your Office you will find the death of Viola Schroeder aged 2¾ years. She died of Diphtheria on Dec. 27, 1893, and was buried in this township (Erin). Her father, Mr. John Schroeder, would like you to grant him permission to move the remains of his child to Saginaw city about first of April. Please send a permit to me as early as convenient."

Mar. 8, 1894, replying to Dr. Yates' letter, the Secretary wrote:—

"Replying to your letter of Mar. 4, relative to the removal of the body of Viola Schroeder, dead of diphtheria, since Dec. 27, 1893, from Roseville to Saginaw city,—the transportation of diphtheria corpses by railroad is absolutely forbidden. This is the wrong time of year to move a body dead of diphtheria, and it is too soon after death. June or July would be the right months, and I should think about one year from June or July, 1894, would be about the earliest date I could probably give any such permit. I would recommend that Mr. Schroeder wait until June or July, 1895."

Mar. 28, Dr. Yates again wrote stating that "Mr. John Schroeder has concluded to accept your advice and not to attempt to remove the body until June or July, 1895."

Disinterment of a Dead Body in Byron township.

April 9, 1894, Nichol D. Emmons, health officer of Byron township, wrote to the Secretary of this Board as follows:—

"I want to know if the township board of health have a right to take up a person who died some 12 years ago with the black diphtheria. Through a mistake of the sexton such a person was buried in a lot belonging to another party, and he wishes to have us take up the body and remove it from his lot as he wants the ground for his own use. Please advise me what is best to do in the matter."

April 12, 1894, in reply to Mr. Emmons' letter, the Secretary wrote:—

"Replying to your letter of April 9, in which you ask for my advice relative to the disinterment and removal of a body dead of black diphtheria some twelve years ago,—I should advise that such disinterment and removal should not now take place. This is the time of year when diphtheria is more prevalent than in summer, and is easily spread. If the removal is to take place at all, it should be done in June or July when there is less danger of the disease spreading. One would then need to have the permit of the health officer of the township in which the body is now buried. Every precaution should be taken that the disease is not spread. I send you herewith recommendations of this Board with regard to exhuming bodies dead from dangerous contagious diseases.

"The foregoing is written with the idea that the body is to again be interred in the same cemetery. If it is to be removed away, other requirements are necessary."

Blanks for Transit Permits.

May 16, 1894, W. H. Andrews, M. D., health officer of Fenville village, wrote to the Secretary of this Board asking from whom blanks for permits for transportation of dead bodies could be obtained.

May 17, In reply to Dr. Andrews' letter, the Secretary wrote as follows:—

"The blanks to be used as transit permits, I think you will be able to get from the local R. R. Station agent. This Office has none."

Removal of Dead Body from Luther Village.

Nov. 15, 94, E. Fairbanks, M. D., health officer of Luther village, wrote to this Office, relative to the removal of a dead body, as follows:—

"Enclosed find permit from N. York for burial of remains of W. Sprague of Luther. As health officer of Luther Board, I will say permission will be, and is, given for removal from here. I will take charge of disinterment and will see that every precaution is taken, hermetically sealed casket, antiseptic precautions, etc. Would like some suggestions on your part as to best methods of procedure, etc. Please send permit enclosed back with your permit."

Replying to Dr. Fairbanks' letter, Nov. 17, the Secretary wrote:—

"Replying to your letter of Nov. 15, relative to the disinterment and removal of a body dead of diphtheria, this is the time of year when diphtheria is most easily spread and I would recommend that the proposed disinterment do not take place until July or August, when the disease is not likely to be spread.

"Before I can issue statement which will answer the purpose of a permit for the transportation of a dead body, it is necessary for me to have the following:—

"1. A certificate of the cause of death, by the attending physician, including not only the immediate cause of death, but also the sickness which led up to it.

"2. The permit of the health officer of the place *from* which the body is to be removed.

"3. The permit of the health officer of the place *to* which the body is to be removed.

"4. The assurance of the health officer of the place from which the body is to be removed, that the body will be carefully prepared for transportation, strictly in accordance with Section 6 of Rule 52, of the General Baggage Agents' 'Rules' which have been approved by this Board, and which may be seen at each railroad station, and on the back of this sheet."

Removal of a Corpse from Toledo, Ohio, to Monroe, Michigan.

Sept. 6, 1894, C. O. Probst, M. D., secretary of the State Board of Health of Ohio, wrote to the Secretary of this Board as follows:—

"I desire to call your attention to a communication received from Dr. Woods, health officer of Toledo, a copy of which I enclose herewith, with reference to the removal of a corpse from that city to Monroe, Michigan, without permission from the health authorities of Toledo. Under the laws of our State and the rules of this Board no dead body can be transported from one town to another, or from one township to another, by rail or hearse, without a permit from the board of health. I should be pleased to know what are the rules of your State in regard to this matter."

Following is a copy of the communicaton from Dr. Woods referred to in Dr. Probst's letter:—

"A woman, Mrs. Hattie McMurchie, died after one day's illness at No. 1342 Summit St., this city. Her friends live in Monroe, Mich. One of our undertakers was called and embalmed the body and prepared it for the coffin. He then waited for further instructions from the friends when they should arrive. No death certificate has been made out and no permit for burial in the city or removal from it. An undertaker from Monroe sent his man with hearse and coffin and without ceremony took the body to Monroe and buried it before we knew aught about it. * * * This was so flagrant a violation of the purpose of the law, that I sent a Sanitary Officer to Monroe to investigate. He found that in that city there are no

regulations, no burial permits, no records and no law of which the Council or Health Board have any knowledge that would enable them to bring the perpetrator of this wrong to justice. This proceeding might result very badly under many circumstances, and I thought it best to lay the case before you that you might, if you thought best, lay it before the Health Board authorities of the State of Michigan."

In reply to Dr. Probst's letter the Secretary of this Board wrote as follows, under date of Sept. 8, 1894:—

"Accept thanks for your letter of September 6, enclosing copy of letter from Dr. J. T. Woods, Health Officer of Toledo, Sept. 5. I should be glad to know the cause of death of the woman who died in Toledo, and whose body was removed to Monroe, Michigan. If the city of Monroe Board of Health had complied with recommendations of this Board, there should have been no difficulty in prosecuting the offender, in case the woman died with any dangerous communicable disease.

"Herewith I send you a marked copy of a pamphlet from which you will see what the law is."

On the same date (Sept. 8) the Secretary wrote to the mayor of Monroe City as follows:—

"Herewith please find a copy of a letter from the Health Officer of Toledo to the Secretary of the Ohio State Board of Health, relative to a dead body brought into Michigan from Toledo.

"Section 1639, Howell's Statutes says that every local board of health shall make and publish regulations, respecting articles which are capable of conveying infection. I trust that your board of health will make and publish such regulations. In this particular instance I am not informed whether or not the body was of a person dead of a dangerous communicable disease, but I infer that it was not; however it appears that your board of health has not taken action to prevent the introduction of such dangerous diseases. I hope soon to be informed that such action has been taken.

"Herewith I send you a pamphlet and leaflet bearing upon the subject, in which I have marked portions."

Removal of Corpse not Properly Prepared for Shipment.

In May, 1894, F. E. Wolfe, M. D., health officer of Metamora township, Lapeer county, wrote to this Office that the corpse of Geo. Kintz, aged 1 year, 11 months and 9 days, dead of scarlet fever, had been shipped from Detroit into his jurisdiction, "not prepared according to railroad rules for shipment of bodies", that the undertaker, Wm. Janssen of 60 Dix Ave., Detroit, did not take his oath to anything", and that the corpse was shipped over the Bay City Division of the M. C. R. R., on the train which left Detroit at 8:20 A. M., May 11, 1894, in charge of the father of the deceased child, who stated on arrival at Metamora, that the corpse was "prepared by undertaker and sealed coffin and that the cover of coffin could be removed as was glass top." When the coffin was opened it was found to be an ordinary casket.

On receipt of the above information the Secretary wrote to the health commissioner of Detroit, advising him of the facts, stating that the corpse ought not to have shipped as it was, and asking "Will it not be practicable for you to decline to give permits for removal outside Detroit except this Office have notice of facts and destination of corpse. I refer to bodies dead of the dangerous communicable diseases."

In reply to the Secretary's letter Dr. McLeod, health commissioner of Detroit, wrote as follows:—

"Replying to yours of May 29th, I inclose herewith blank form of our transit-permit. In the case in question, the front portion was properly filled out and stamped 'CONTAGIOUS'. The back part of this permit, if not properly filled out, is the fault of the railroad company in accepting the body from the undertaker, whose duty it is to make affidavit that it has been prepared for shipment by him according to law and as required by the rules of the railroad over whose lines the body is shipped. We have nothing whatever to do with the filling out of the back part of these transit-permits."

The "back part" of the permit referred to by Dr. McLeod contains affidavit of the undertaker that the corpse has been prepared by him for shipment.

May 29, the Secretary wrote also to H. P. Dearing, General Baggage Agent of the M. C. R. R, Chicago, Ill. In his letter to Mr. Dearing, the Secretary explained the facts relative to this case and concluded as follows: "The box ought not to have been opened at its destination, nor should it have been shipped as it is reported. It seems to me that no corpse dead of a disease like scarlet fever, small-pox or diphtheria should be started until the health officer of the place to which it is destined shall have had knowledge of the proposed shipment. If information came to this Office I should immediately notify the heath officer of the locality not to permit the body to be viewed nor the box opened."

In reply to the Secretary's letter Mr. Dearing wrote, May 31:—

"I find this body was put on our train at Bay City Junction. I have taken the matter up with our Agent at Detroit and Health Officer at Detroit, and also the Undertaker, and will undertake to investigate the matter thoroughly and advise you the result."

According to the promise made in the last preceding letter, Mr. Dearing fully investigated the circumstances connected with the shipment of the corpse in question, and June 20, 1894, wrote to the Secretary as follows:—

"In reference to an employé of this company being at fault: would say, that Bay City Junction is not a regular station; we have no regular Agent, and only employ an Operator at that point, no tickets are sold and no baggage checked, and it never had occurred to us that a body would be delivered to the company at that point; and as a result our Operator was not fully conversant with the rules, and therefore did not stop the body as would be expected under all ordinary circumstances. I am humiliated at the thought that we are in a little measure at fault in this unfortunate affair, but wish to emphasize the fact that we propose to prevent a similar occurrence, and I would be gratified to know that we should, in like manner be able to look for an improvement at Detroit. You will note that the undertaker claims that he was all right in preparing the body for shipment, and I doubt not would not have hesitated to have made affidavit that the body was prepared in accordance with the rules. It occurs to me, therefore, that we should have a better understanding with the undertakers in Detroit and the Health Authorities, or I am not sure that we would be protected, even though the certificate was accompanied by an affidavit, and I am inclined to believe, from the nature of things, we must look for this protection at the initial point; and simply advising the Health Officer in any locality that a body would be shipped into his neighborhood would not insure protection, unless that body was properly prepared for shipment.

"I do not say that your proposed notice would not be beneficial, but you will note that in the event it was proposed to ship a body from Marquette to Seney that it would be hardly practicable for a notice to come to you and you notify the Health Officer at the terminal point unless such notices were sent by telegraph.

"I am inclined to believe that if our rules were properly enforced and a body was prepared for shipment in accordance with those rules, that there should be no element of danger. Do you think that we will again be confronted with a case where a man would be found in the State of Michigan that will open a box purposely that is supposed to contain a body dead of a contagious or infectious disease? I do not think that such a thing should be looked for, but if this body was prepared for shipment as is claimed, then there is an element of danger, even though it was not opened at destination.

"It occurs to me that if Dr. McLeod will not take action in the matter that it might be well to lay the subject before the whole Board at Detroit."

SUSPECTED TYROTOXICON SICKNESS IN MICHIGAN IN 1894.

June 1, 1894, Dr. E. J. Johnson, health officer of Romulus township, Wayne county, sent to the Secretary of the State Board of Health, a sample of cheese, which was believed by Dr. F. D. Whitacre, of that place, to have caused at least twelve persons to be sick, within the last few days.

Secretary Baker sent the piece of cheese to Dr. Victor C. Vaughan, Director of the State Laboratory of Hygiene, at Ann Arbor, for examination, and, later, June 18, wrote to Dr. Vaughan asking the result of the examination.

Dr. Vaughan replied, June 23, as follows:—

"We have made a pretty thorough study of the cheese sent by E. J. Johnson, health officer of Romulus, Michigan, and fail to find any poison in it. One of the assistants ate quite a quantity of this cheese without being in the least affected by it."

Managers of cheese factories in Michigan seem to have given much attention to, and to have acted on the recommendations which have grown out of the discoveries by Prof. Vaughan, as to the modes of development of tyrotoxicon, and the numbers of outbreaks of sickness attributed to poisonous cheese have apparently greatly decreased.

LEAD POISONING IN MICHIGAN IN 1894.

Concerning a case of lead poisoning at Horton, Jackson Co., Dr. W. A. Fallas, wrote to the Secretary of this Board September 4, 1894, as follows:—

"I have a case of lead poisoning with classical symptoms and blue line on gums, in which we are totally at a loss as to the source of poison. No lead pipe about well, no painting around, has handled no lead or paint, used no hair dyes or washes. Patient is a farmer about 40. I venture to ask your judgment as to the possibility of intoxication from following sources:

"At the well there is a galvanized iron (zinc covered iron) tank. Could it arise from this or from the solder used on it?

"There is in the tank a piece of tin on which white lead paint has been spilled and dried. What of that?

"Could babbit metal in valves of pump be the source?

"The family have used about 2 doz. cans (tin) of corn and salmon during the season; a can of corn is still on hand; could this be the source, and would it pay to analyze the corn?

"The man has worn for two months dark cotton trousers which color the skin freely when he sweats. Would you think it worth while to have them examined?

"A knowledge of the source is of great importance in view of the future protection of man and his family and I would thankfully receive any suggestions."

September 6, Secretary Baker wrote to Dr. Fallas as follows:—

"Replying to your letter of Sept. 4, relative to source of lead poisoning, you do not state the facts sufficient to enable me to form an opinion. You say 'At the well there is a galvanized iron tank. Could it arise from this or the solder used on it?' You do not say whether the patient drank water from this tank. If he did, the lead *might* be derived from that. You say 'There is in the tank a piece of tin on which white lead paint has been spilled and dried.' Whether or not this was the source of lead in the patient, depends on whether the patient drank the water in which the tin had been placed. I do not think babbit metal in valves of pump likely to be the source of lead.

"Ordinary tin cans are coated with an alloy of lead, and may be the source of lead poisoning. I think acid fruits and tomatoes more likely to dissolve the lead in cans, than is either corn or salmon; however, you might test the corn juice for lead.

"On page 11 of the report of this Board for 1879 you will find a 'Test for Lead in Tinware,' which is as follows:—'Place a drop of strong nitric acid on the tin surface, by means of a glass rod or even a splinter of wood, and rub the acid over a space as large as a dime; warm it very gently until it is dry; add a drop of water, and then drop two drops of the solution of iodide of potassium on this spot; the bright yellow iodide of lead will form on this spot, if the tin contains lead. This test can be very rapidly applied and its results are decisive.'

"I shall be glad to learn of the results of your investigations, and I enclose a stamped envelope for your reply after investigations."

POISONING FROM DRIED BEEF.

During the year 1894 an instance of poisoning believed to have been caused by eating dried beef, came to the knowledge of the Secretary of this Board, details relative to which are given in the following correspondence:—

January 4, 1895, the following letter dated Dec. [Jan.] 2, 1895, was received from Dr. R. C. Traver, health officer of Somerset township, Hillsdale county:—

"I was called to see the family of W. B. Van Allen of this place, Dec. 31, 1894, and found the whole family (Mr. and Mrs. Van Allen, a young man and two children) suffering from poison, which I thought at first was tyrotoxicon or cheese poisoning, and on inquiry found they had eaten for their supper: bread and butter, raspberry sauce, tea, and some dried beef purchased at a neighboring grocery store. I have made up my mind that the 'beef' was the source of the trouble. The symptoms were obstinate vomiting, great depression of the system, pale and very nervous, haggard and anxious expression of countenance, pulse accelerated; but no fever and no catarrhal trouble of the bowels. They all made good recovery on the day following, with no lesion left behind. Have you heard of any like cases? Please write me. The grocer has not sold any more of the beef since. I send you a sample of the beef enclosed."

Jan. 4, 1895, the Secretary replied to Dr. Traver's letter as follows:—

"Replying to your letter of 'Dec. 2, 1895' (which came to this Office this morning), I have sent a copy or your letter, and the sample of beef, to the State Laboratory of Hygiene, at Ann Arbor, of which Dr. Victor C. Vaughan is director, requesting him to let me know what arrangements could be made for an analysis of the beef.

"During the mean time, I should be glad to have you secure the saving of two or three pounds of the beef, enough to enable him to make a thorough investigation, if thought practicable."

Jan. 13, 1895, Dr. Traver again wrote, as follows, to the Secretary:—

"Your letter of the 4th inst. is at hand, and in answer, I tried to get more of the suspected beef, but was unable to for the reason that it was all gone. I learned that other families used from the same suspected piece with no symptoms of the poison.

"I consulted with Mr. Van Allen and found they had eaten bread and butter, raspberry sauce, tea, and dried beef for supper on the night of their sickness. The berries were some that were canned in a new Mason jar and put up in the usual form.

"I am sorry I could not get the amount you need for analysis. Anything I can do in the matter will be forthcoming on your request."

January 15, 1895, Secretary Baker replied to Dr. Traver's last letter as follows:—

"Replying to your letter, I send you herewith a part of the abstract of the proceedings of the meeting of this Board Jan. 11, 1895, in which I have marked a preliminary report by Doctor Vaughan, director of the State Laboratory of Hygiene, relative to the examination of the dried beef. He has promised to make a written report in a few days when I will endeavor to send you a copy."

Following is copy of the extract from the proceedings of this Board referred to in the last preceding letter:—

Doctor Vaughan, the committee to whom was referred the subject of suspected poisoning by dried beef, at Somerset Center, Hillsdale county, reported: "We find that the meat contains a short bacillus which, when injected under the skin of rats, guinea pigs and rabbits, causes death within from 24 to 48 hours. The bacillus causes marked local irritation, and there can be no doubt that it was the active agent in causing the distress in the persons who ate of the meat. A careful biological study of this germ will be made, and a further report* will be sent you at a later date."

SUSPECTED POISONING BY PRESSED CHICKEN AT STURGIS.

Doctor Vaughan also reported relative to suspected poisoning by pressed chicken at Sturgis. During a banquet some 200 persons were poisoned. A sample of the chicken was examined at the State Laboratory of Hygiene, and found to contain a short capsulated bacillus which was poisonous, but not of such a virulent character as the one found in the dried beef. It was found, by inoculation, that the germ would kill guinea pigs, but did not kill rats.

"FOOT AND MOUTH DISEASE" IN MICHIGAN IN 1894.

During the year ending December 31, 1894, one outbreak of "Foot and Mouth" disease was reported to the office of the Secretary of the State Board of Health. The outbreak was reported from Manistee City, and the correspondence relative thereto is as follows:—

August 7, Dr. D. E. Robinson, Health Officer of the city, sent the following telegram to Secretary Baker:—

*This more complete report from Doctor Vaughan was never received.

"Foot and mouth disease reported in three herds furnishing milk to city. Prohibited sale of milk from these places. Is that right. Wire answer."

Secretary Baker immediately wired as follows:—

"I think milk of animals with foot and mouth disease should not be sold."

Dr. Robinson, under date of August 7, wrote to Secretary Baker as follows:—

"There has been reported to me today the presence of foot and mouth disease among the cows of three parties furnishing milk to our city. Shall stop their distribution of milk until their herds are free from all evidence of the disease. Have been talking a milk inspectors ordinance here and think this will bring it.

"If measures I propose are not right please inform me."

Under date of August 9, Secretary Baker wrote the following letter to Dr. D. E. Robinson:—

'Your telegram of Aug. 7 was received about 4 P. M. and I immediately telegraphed you: I think milk of animals with foot and mouth disease should not be sold. I believe your action in prohibiting the sale of milk of animals affected with the 'Foot and Mouth Disease' was proper and in the interest of public health. As I understand the disease, it is dangerous to man as well as animals. It is claimed that the disease can be communicated to animals by means of milk of affected animals, and it is not at all improbable that the milk of affected animals is dangerous to man.

"I have this morning notified Hon. H. H. Hinds, of Stanton, and given him the facts in the case, as I have received them from you. He is President of the State Live Stock Commission, and may take some action. Until the State Live Stock Commission takes charge of the cases in animals, I believe it is the duty of the local board of health to guard the public health and see that the disease does not spread.

"I send you herewith a copy of the milk ordinance of Menominee."

Dr. Rowland Godfrey Freeman, an emient pathologist of New York City, in his publication: "Milk as an Agency in the Conveyance of Disease" cites two instances of "Foot-and-Mouth Disease" communicated by milk. Dr. Freeman states:—"That foot-and-mouth disease may be communicated by milk has been demonstrated experimentally. Hertwig and two friends drank daily for four days a quart of milk each from a cow suffering from foot-and-mouth disease. In less than two days the symptoms of the disease appeared in each and lasted five days. The mucous membrane of the mouth became swollen and on that covering the inner surface of the cheek small vesicles appeared. Vesicles appeared also on the hands in one case. The results of Hertwig were confirmed by Jacob.

"In 1884 an epidemic occurred in Dover, England, which involved one hundred and thirty consumers of the milk of one milkman. The attack was characterized by shivering followed by a headache, fever, pain in the limbs, thirst, parched lips, and a vesicular eruption of the throat. On one of the farms supplying this milkman the cows were found to have been suffering from foot-and-mouth disease. Other cases of foot-and-mouth disease transmitted to man by milk are reported by Weigel and Noack, Schäffer and Esser, Esser and Schütz, and Weissenberg. In this country foot and mouth disease is comparatively unknown."

HYDROPHOBIA (RABIES) IN MICHIGAN IN 1894.

During the year ending December 31, 1894, there were reported to the Secretary of the State Board of Health seven outbreaks of this disease, in the following-named localities in Michigan: Cohoctah township, Livingston county; Pontiac township, Oakland County; Chesaning township, Saginaw county; Saginaw city W. S.; Ellington township, Tuscola County; Detroit city, and Plymouth township, Wayne Co.

Details relative to the above-mentioned outbreaks are as follows:—

Suspected Rabies in Ovid Village, Clinton County.

A paragraph in the Ovid Register-Union, of Aug. 9, 1894, relative to the death of a boy by hydrophobia, having come to the notice of the Secretary of the State Board of Health, the Secretary wrote the following letter to Dr. James E. Taylor:—

"The *Ovid Register-Union*, for Aug. 9, 1894, contains a notice of the death of the son (about six years) of Mr. and Mrs. B. D. Sherman, of Solomon City, Kansas, formerly of Ovid township. It is stated that the boy died of hydrophobia, caused from the bite he had received from a dog in June, 1893, while in Michigan.

"I should be glad to have any additional facts you may have. Was any other person bitten? Did any other person have hydrophobia? Were there any other cases of rabies? Are the above statements of facts substantially correct?

"I write you because you were the health officer at that time. No health officer seems to have been appointed for this year. Can you kindly inform me who is the present health officer?"

The following letter, dated Aug. 14, 1894, was received from Dr. Taylor:—

"Illness caused the delay in replying to yours of Aug. 11th regarding the case of hydrophobia mentioned in the Register-Union. There are no more facts that I know of, neither does our editor know of anything except the article in the paper. I do not place much confidence in the report." * * *

Hydrophobia in Cohoctah Township, Livingston County.

Information having come to the Secretary of this Board of an outbreak of rabies in Cohoctah township, he wrote, Dec. 13, 1894, the following letter to Dr. W. H. Erwin, Health Officer of Cohoctah township, at Oak Grove. Similar letters were sent also to Dr. J. J. Howard, Health Officer of Burns township, to Dr. A. R. Ingram, Health officer of Argentine township, and to Dr. Wm. Harper, Health Officer, Deerfield Tp.

"I am informed that a child, some horses and hogs, have been bitten by a rabid dog in or near 'East Cohoctah', in Livingston County. Can you give me any information relative to the subject?

"Rabies is a *disease dangerous to public health*, and can be communicated from animals to man, and from person to person, and precautions should be taken to prevent its spread. All bitten animals should be separated from others, and kept confined until they die, or if they live until the period of incubation is passed, say for at least six weeks.

"Persons who are afflicted with rabies (Hydrophobia) should be guarded so that they cannot do injury to others.

"Please keep this office 'constantly informed' of the progress with this disease, by reports.

"P. S. Dr. Barringer, Member of the *State Live Stock Commission*, will visit your vicinity today, and endeavor to do all that the State can to stamp out this serious disease. But this will not relieve you from duties for the protection of human kind."

In a letter dated December 14, Dr. Harper wrote to the Secretary as follows:—

"A boy was bitten by a dog at East Cohoctah and the bite has been properly treated. It is not known whether the dog was rabid or not, but the fears are that it was.

"A short distance from there animals have been bitten and said to become rabid.

"It is out of my township but am willing to do anything in my power."

Dr. Barringer made an investigation of this outbreak, and in his report to Hon. H. H. Hinds, president of the Michigan Live Stock Sanitary Commission, dated Armada, December 17, wrote as follows:—

"There is no place there (Cohoctah). P. O. and 7x9 station. Could not get a livery or find any one to take me into the country, so walked out two miles to Frinks (probably Fay). Did not find him at home and walked one and one-half miles farther into the woods where he was at work. The facts, as near as I could learn, are as follows:—

"Five weeks ago last Thursday a mad dog came through the town, and bit some hogs for two different farmers near Frinks, and it was rumored that some horses were bitten that were being driven over the road, but could not trace it. No people were bitten at that time. The dog was killed, also other dogs that were bitten, and the farmers spoke of, who had hogs bitten, separated them from others and shut them up. The hogs, both lots that were bitten, came down with the Rabies last week, and the last of them had been killed the day before I arrived. That cleaned up the matter so far as I could learn as to the first day. Last week or about the Tuesday before I arrived, another tramp dog came through the town, bit some dogs, went to the school house and, as I learn from the scholars, the boys chased him about some. He went into the school house and bit a small boy in the instep, when one of the larger boys picked up an ax that lay near the stove and knocked the dog in the head, killing him. The boy was the only person bitten by the dog, and no stock that I could trace to any source. Some other dogs had been set on to the strange dog and in a row were bitten, but Frink informed me that they had all been shot. There are three or four of the Frinks living close by each other and they are located right in the midst of the mad dog scare. There might be some question about the last dog having rabies as he was playful with other dogs and from his actions as described by parties I thought there might be some doubts.

"I did not see the Supervisor because I could not reach him and get home. He lives corner ways across the town 7 miles from Cohoctah and nearer Fowlerville. His name is Charles Dunston, P. O. Fowlerville, and should you wish to go there at any time, Fowlerville is the place to go to. You could do nothing from Cohoctah. I could find nothing that needed quarantine and was informed by Frink that the dogs had been shot and think there will be no further trouble unless the last dog did some damage there that people do not know of. The boy that was bitten was 5 or 6 years old, and was bitten through a rubber boot or shoe and a heavy woolen sock. I wrote the Supervisor in the matter, expressing my regret in not being able to see him. Mailed him a copy of the law, also stated to him the facts and advised him to look after it; and if anything occurred that he should need our assistance to communicate with you. Also instructed the people if anything farther occurred in the matter to notify town board."

December 19, Dr. Erwin wrote the Secretary of the State Board of Health as follows:—

"There are no new developments in regard to the *Rabies* in this township, and if anything occurs I will let you know at once.

"I am watching the boy that was bit by the dog said to be mad, and if the boy shows any signs of hydrophobia will use every precaution."

Suspected Rabies in Green Oak Township, Livingston County.

The Secretary of this Board, noticing a paragraph in the columns of the Livingston Democrat of Jan. 3 relative to an outbreak of rabies in Green Oak township, wrote as follows to Robert W. Olds, Health Officer of that township:—

"In the Livingston Democrat of Jan. 3, 1894, appears the following item:—

"'A calf belonging to J. W. Knight, of Green Oak, and which was bitten by a dog some time ago, recently developed such violent symptoms of hydrophobia that it had to be killed.'

"Will you have the kindness to give any information you may have on the subject?

"Whose dog bit the calf? What has become of the dog? Is the dog still living? Were any persons bitten by this dog? Have any other animals been bitten by this dog or by the calf? Do you know of any cases of rabies or hydrophobia in your township or surrounding townships which have been caused by this dog or any other dogs which were bitten?

"Act 137, Laws of 1883, provides that the health officer shall immediately investigate any disease dangerous to public health, and order the prompt isolation of the sick or infected so long as there is danger of the disease being communicated to persons. Under no circumstances should the local board of health fail to guard the life and health of citizens from this most fearful disease—rabies.

"Herewith I send you a copy of the work of health officers, in which I have marked parts bearing on the duties of the local health authorities. Sections 5 and 6 of Act 125 Laws of 1889 require that the health officer or local board of health shall immediately report the fact to the State Live Stock Commission, of which Hon. H. H. Hinds, of Stanton, Michigan, is president.

"Herewith I send you stamped envelope for your reply."

Mr. Olds, under date of Jan. 6, 1894, wrote as follows to the Secretary:—

"In regard to the calf belonging to J. W. Knight of this township and which showed symptoms of *Rabies*, your letter was the first intimation I had. Upon inquiry I found that the calf acted strangely and was killed. It did not offer to bite anything and never was bitten so far as known."

Rabies in Pontiac township, Oakland County.

An item appeared in the Detroit Journal, March 20, 1894, relative to rabies in Pontiac township and under date of March 21, the Secretary of this Board wrote to William Cotcher, Health Officer of Pontiac township, as follows:—

"The following item appeared in the Detroit Journal, March 20:—

"'Pontiac, Mich., March 19—Two weeks ago, Edwin Hotchkiss, a farmer living one and a half miles north of Pontiac, was aroused in the night by a noise among his sheep, and going to the barn saw a large black dog escape from the enclosure after killing eleven of his flock and mutilating the remainder, which numbered about 30. Saturday he called a veterinary surgeon, to see those that had been bitten, and he declared they were suffering from hydrophobia. He told the Journal that it was a sad yet a most amusing sight to see the sheep bunting and biting each other, and froth rolling from their mouth and nostrils. He informed the health officer, who will bring the matter before the common council tonight, when they wil undoubtedly order all dogs running at large to be muzzled for 30 days. The township of Pontiac, where Mr. Hotchkiss resides, will pay him for the loss of his flock.'

"Will you have the kindness to give me any other information on the subject you can?

"Is the foregoing newspaper report substantially correct?

"Were any *persons* bitten, or any other animals bitten?

"How many cases of rabies were there in your township, and are there any cases existing at present?

"Have you knowledge of this dog or any other dogs being rabid, or causing damage to the life of animal or human beings in any adjoining township?

"I enclose a stamped envelope for your reply."

William Cotcher replied that the newspaper report was substantially correct, that no persons, or any other animals were bitten, and that no *case* of rabies existed in his township at the time of writing.

The following notice was served upon Mr. Hotchkiss by the local Board of Health.

"To Edwin S. Hotchkiss:—

"The undersigned board of Health of the township of Pontiac in the county of Oakland having found upon the premises of A. J. Hotchkiss being occupied by Edwin S. Hotchkiss in said township of Pontiac a certain nuisance, to wit: Five Sheep, which in our opinion may be and is injurious to the inhabitants of said township being in our opinion infected with Hydrophobia. Now therefore you are hereby ordered to remove the same at your own expense within twenty-four hours after the service of this order upon you under penalty provided by law in case you neglect to do so.

(Signed) STEPHEN REEVER, *Supervisor.*
WM. COTCHER, *Health Officer.*
ABRAM OSMAN, *Clerk of the Board of Health.*

Mr. Cotcher, Mar. 27, 1894, wrote "I have also ordered Mr. Hotchkiss to keep his dog tied up for the next thirty days under a fine of 25 dollars if he neglects to do so, or if found running at large, or off his premises. Mr. Hotchkiss has received from the township of Pontiac the sum of $95.00 for the loss of his sheep in this matter."

Rabies in Chesaning village, Saginaw County.

Sept. 11, the Detroit Tribune gave notice of an outbreak of rabies in Chesaning village, and on Sept. 14, the Secretary of this Board wrote Dr. D. W. Mudge, Health Officer of Chesaning, as follows:—

"The following item appeared in the Detroit Tribune of Sept. 11,—

"'Chesaning: This town was recently thrown into the wildest state of excitement by a ferocious mad dog. Two hogs owns by Daniel Monroe were bitten and had the rabies. They in turn mangled a valuable cow, which had to be killed. The dog fled to the woods and now half the town is laying for him with guns.'

"Will you have the kindness to give me all the information you can relative to the subject?

"Is the foregoing newspaper report correct?

"Were any persons bitten by any rabid animal?

"Are there any cases of rabies in your village at this time?

"Have you any knowledge of other dogs being rabid and causing damage to animals or human beings in any adjoining village or township?

"I enclose a stamped envelope for your reply."

Oct. 15, Dr. Mudge replied by the following letter to the Secretary:—

"I have deferred the answering of the within question or questions on the enclosed sheet from you until I could look the matter up and do it correctly. The quotation from the Detroit Tribune is partially true and partially in error. Our village was not much excited. However, we had a marshal at the time, with whom the boys were having more or less fun, and he came to me one day with a complaint that certain parties' dogs had been bitten by a dog which was believed to be 'mad' and that said parties refused to kill or allow killed said bitten dogs, and I replied that if they had been bitten by a dog with hydrophobia that they *must* be confined at least in order to determine for sure if they were cases of hydrophobia—Still this being the first I had heard of the matter gave it but little attention. As there was about that time so many jokes being played between the boys and especially upon the marshal to cause him to do something.

"However these dogs were all killed and several others.

"Then it seems that the original 'mad dog' took a southeasterly course doing no further damage, as I can determine, until about two and a half miles south and the same distance east of our village in the neighborhood of this said Daniel Monroe, for whom he bit two hogs which died on the fourteenth and sixteenth days respectively. Also a cow which was heavy with calf. This cow, Mr. Monroe did not think was bitten, or at least was suffering or would suffer from hydrophobia, was about the farm when

she had her calf, after which when any one would go into the barn where she was tied she would sometimes make a slight effort to dive (as he called it) at them, but generally would appear nervous and fall over in what from Mr. M—'s description was a convulsion or nervous spasm. She would secrete in the mouth, a part of the time a foamy, slimy element; by times again the mouth would be dry and the mucous membrane would thicken and swell; and finally at about the fifth week after being bitten, and one week after calving, the cow died.

"The dog after leaving Monroe's comparatively unnoticed went to near neighbors and bit some turkeys and chickens which died, and finally again the idea occurred in the neighborhood that the dog was 'mad,' when one of them, the neighbor, took his gun, found the dog near by lying partially under a sluiceway in a road, when the dog was shot and killed.

"Any farther information I will gladly furnish if it is anything which can be gotten at this date."

Hydrophobia in Saginaw city, W. S.

Secretary Baker received the following letter, dated August 24, from Doctor E. E. Curtis, Health Officer of Saginaw, W. S.:—

"I enclose an item from the 'Saginaw Courier Herald' which gives the facts as far as I am able to learn in regard to a case of Hydrophobia.

"The case was reported to me last evening. The patient died during the night."

The item which Doctor Curtis enclosed from the "Saginaw Courier Herald" appeared in the issue of August 24 and reads as follows:—

"Andrew J. Blanchard, a resident of this city for the past 30 years, and who has lived at 1108 North Porter street for the past 14 years, was taken ill Tuesday.

"Dr. W. F. Morse was summoned and he thought he detected symptoms of hydrophobia. Yesterday the last doubt was removed, and the case is undoubtedly of that dread type. Dr. Morse called Dr. Bliss in consultation yesterday and the usual remedies are being used, but there is small hope of saving the man's life. Mr. Blanchard complained Wednesday of severe distress of the stomach, he also showed an aversion to water, though suffering intense thirst, Wednesday night. Thursday his breathing was labored, as if he were being suffocated. He showed some delirium and feared that some great harm was to befall him. When spoken to sharply he would comprehend what was said. Yesterday, when the Courier-Herald man called, there were several neighbors around the house. Mr. Blanchard's every breath was a half groan. He was dressed and was constantly in motion. Much of the time he suffered from burning fever and again would complain of chills. Physicians think he will live scarcely 48 hours.

"Mr. Blanchard was bitten July 3 by a dog belonging to Mrs. William Close. The bite was on the back of the left hand. It was not regarded as serious. About the same time the dog attacked a woman and tore her dress. Complaint was made to the police and the dog was shot. He was known to be a vicious animal. Mr. Blanchard showed signs of hydrophobia seven weeks to a day from the time he was bitten. It is not known whether the dog bit any one else or not, but dogs showing strange symptoms should be watched, as the disease is liable to develop from the case that is now established. Mr. Blanchard is about 60 years of age, and is of English or Scotch birth.

* * * * * * * *

"It was suggested that Blanchard be sent to the Chicago institute for treatment, but his physicians thought his case had progressed too far to make that of any use."

Rabies in Indian River and Ellington Townships, Tuscola Co.

July 17, Secretary Baker received a letter, dated Caro, July 16, from John T. Kane, Health Officer of Almer township. Mr. Kane stated that a mad dog had come from Ellington township over into Almer township, and he wished to know what steps he could take to guard against the dreaded disease.

Secretary Baker immediately replied to the letter as follows:—

"Accept thanks for your letter of July 16, informing me about a 'mad dog.' I have written the health officer of Ellington Tp.

"Herewith I send you a pamphlet in which I have marked parts bearing upon your action as a health officer in cases of this kind. Rabies is a '*disease dangerous to the public health*' and should be promptly

restricted by you, in accordance with Act 137, Laws of 1883 (on page three of the pamphlet I send you) and under no circumstances should you allow the disease to spread. The dog should be captured and isolated if he has bitten any person or animals, until it is absolutely known whether or not he was really mad. All animals bitten should be promptly isolated until it is known whether they are going to have the disease. If the dog *has not bitten* any person, it is best he should be immediately killed. Please write me full particulars of this outbreak of rabies. How many animals have been bitten, and have any contracted the disease? Was any person bitten by a rabid animal? Has the dog been killed? If not, where is he now? Through what township or village did he pass?

"I have notified the president of the State Live Stock Commission, Hon. H. H. Hinds, of Stanton, and you had better write him full particulars as the law provides."

In a letter to Amzy Clay, health officer of Ellington township, July 17, Secretary Baker stated:—

"Information reaches this office from the health officer of Almer township that a 'mad dog' was in the township of Ellington."

[The letter continued the same as in the preceding letter (to John T. Kane) beginning with the second paragraph.]

July 25, Secretary Baker received a letter, dated Caro, July 23, from Mr. Kane, which read as follows:—

"In reply to your letter in regard to the mad dog, as near as I can find out, the dog came through this section some time last April, but it was not known to be mad at this time. In this outbreak three dogs so far have died; none of them were killed. I am holding quite a number at the present; none of them so far has shown any sickness whatever, although some of them are known to have been bitten. No person was bitten and no cattle so far as known."

July 25, 1894, Mr. Amzy Clay replied to the Secretary's letter as follows:—

"Your letter of July 17 was duly received and contents noted. It was the first information of any kind I had received of the existence of the disease of hydrophobia or rabies being anywhere in the country. I have tried my utmost to find the existence of a dog having that disease in the township of Ellington but in vain. While out investigating the matter I learned of a dog dying in Ellington about two months ago. Some thought it had the rabies, but the owner, P. C. Frost, gave me the information I now give you.

"On a certain night, about two months ago, after he and his family had gone to bed, the dog barked violently. He got up, looked out of the window and saw two men standing in the road before his house. They ascertained that they were seen and started off. Some time afterward he heard the dog barking again and got up and saw the two men again west of his house standing and looking that way. He talked some to his dog and they started off. The next morning he found the dog acting strangely as if something ailed him. He refused to eat and refused to drink milk. He lived three days and died. Towards the last the dog would frequently drink cold water but would not touch anything else. The dog was not away from home but was confined there. He thinks the dog was poisoned by those two men he saw, from the fact that he had a lot of pork stolen the same night. His symptoms were more of poison than of hydrophobia.

"I also learned of three dogs in Almer township that it was thought had hydrophobia. One died two weeks ago last Saturday night, belonging to Charles Trader.. He got away and was gone three days or thereabouts and then returned home. I heard that while gone he bit several dogs but do not know as to the truth of the story. When the dog returned home, he sprang upon Mrs. Trader, and bit her upon her left arm, through her dress sleeve but did not draw blood. I cannot learn as he was in Ellington. He was along the town line, but I cannot learn of his biting any one save the woman spoken of above. After she was bitten, she sent for Herbert Orr, a veterinary surgeon, living close by and he confined the dog in an outbuilding where he died the same night.

"I have spent about a day and nearly a half in ascertaining the above facts; all of which I submit to to the State Board of Health for their consideration."

Secretary Baker replied, July 28, to Mr. Clay's letter as follows:—

"Please accept thanks for your letter of July 26, relative to hydrophobia or rabies in Ellington township.

"The local board of health of Ellington township should pay you a certain amount for the time you spent in looking the facts up.

"From your report I think the dog which bit Mrs. Trader was probably rabid, and she was fortunate in the fact that the dress protected her arm so that the virus did not enter."

Rabies in the City of Detroit.

November 16, there appeared the following item in the Detroit Tribune:—

"A mad dog ran amuck at the corner of St. Antoine street and Garfield avenue yesterday afternoon, and before he was finally shot by Patrolman Curtis, he bit four or five boys. Two of the boys were S. G. Zim and Fred Koenig. They were taken to Harper Hospital, but neither was seriously hurt. The names of the other boys could not be learned. The owner of the dog is unknown."

The following day (November 17) another article appeared in the Detroit Tribune; in which the principal point stated was as follows:—

"The symptoms indicate that the dog was undoubtedly mad, but it will not be known for nine days whether the boys were inoculated."

November 17, Secretary Baker wrote the following letter to N. W. Webber, M. D., acting Health Officer of the city:—

"Referring to the article in the *Detroit Tribune*, of this morning, relative to two children bitten by 'a dog undoubtedly mad,' I would respectfully suggest that measures ought to be taken to have these two children treated by Pasteur inoculations. Valuable time ought not to be lost during the period of incubation, (not 'nine days' as stated in the newspaper, generally forty to sixty days) before the treatment is commenced. Doctor Paul Gibier, of 97th Street, and Central Park, is director of the New York Institute, and A. Lagorio, M. D., 65 Randolph St., is director of the Chicago Institute.

"I sincerely hope that these children will not be allowed to die from this fearful disease.

"I shall be glad to know whether or not the report in the newspaper is substantially correct? I shall be glad to have any additional facts you may have relative to the action of the friends regarding the treatment of the children, and, measures taken by the health department to guard against further danger from dogs bitten by the one which bit these two children."

November 22, Secretary Baker received the following letter from Doctor Webber:—

"Referring to your communication of the 17th inst. I sent a physician connected with this department to the family, and offered them to have the children taken to New York for treatment. The parents, however, are of a rather intelligent foreign nationality and prefer to have their children treated according to the method of their own family physician. I am under the impression that the board of health has no power to enforce any particular treatment and for that reason did not insist upon my offer being accepted."

Secretary Baker, under date of November 22, replied as follows:—

"Accept my thanks for your letter of Nov. 21. I agree with you perfectly that the board of health has no power to do anything about the treatment of rabies or any other disease, and ordinarily I would not have suggested anything on the subject, but rabies is out of the ordinary and is better understood by boards of health than by the people generally. I am very glad that you had already made the parents the offer which might have been the means of saving the children. I hope their lives may be spared under the care which they have received."

Rabies in Northville, Plymouth Tp., Wayne Co.

A paragraph appeared in the Detroit Free Press, of February 28, relative to an outbreak of rabies in Northville. March 2, Secretary Baker wrote the following letter to Perine E. White, Health Officer of the village:—

"The following item appeared in the Detroit Free Press, Feb. 28, 1894:—

"'A mad dog was killed on the farm of A. B. Coldren, at Northville, after it had bitten a cat, several hens and a hog.'

"Will you have the kindness to give me any information relative to this mad dog that you can? Is the above substantially true?

"Was any person bitten? Were there any cases of hydrophobia?

"How many cases of rabies were there?

"Can you tell me whether this dog passed through or into any other jurisdictions, and did any damage? If so, what jurisdictions?

"Will you have the kindness to give me all the facts you can relative to the actions of this dog affected with rabies."

Under date of March 8, Mr. White replied as follows:—

"Yours of March 2 received. The case mentioned by you in regard to the mad dog owned by O. B. Coldren as stated in the Detroit Free Press was substantially true

"Mr. Coldren lives nearly four miles in the country and not until this A. M. did I have a chance to interview him. About ten days ago Mr. Coldren's dog came from home, about two miles directly toward Northville, then returned and on the trip bit two or three other dogs and on coming to Coldren's premises commenced to attack the poultry and the pigs. As soon as Coldren saw the condition of the dog, he killed him, and all the other animals bitten except one pig which he placed in a perfectly safe place to see how it would be affected, but as yet I think nothing unusual has developed. It is believed that everything bitten by the dog has been killed except the pig mentioned and no uneasiness seems to exist among the people in the neighborhood.

"Should anything new develop I will post you immediately."

Secretary Baker replied as follows, to Mr. White's Letter March 9:—

"Accept thanks for your letter of March 8, relative to rabies. The period of incubation for rabies is indefinite, but is usually about forty days, so that in about forty days from the time that the pig was bitten by the dog will be a good time to observe its action. In about fifty or sixty days from the time that the pig was bitten, I will be pleased to hear from you again relative to this subject, giving me particulars in regard to it. I enclose stamped envelope."

Under date of March 29, Mr. White wrote as follows:—

* * * * * * * *

"The mad dog you wrote me about on the first of the month, we think bit nothing but what has been killed. The pig, which I told you was bitten and placed in a secure pen in order to see what might develop, died a few days ago. There was nothing in particular to be seen in the condition of the animal except an inclination to bite and bark whenever it was disturbed. Otherwise it would lie in the nest perfectly quiet. The wound made by the dog never healed entirely and nothing unusual could be seen until three or four days before it died and then as above stated."

April 4, Mr. White wrote again, as follows:—

"It was twenty days from the time the pig was bitten by the rab'd dog until it died.

"Nothing unusual was noticed in the actions of the pig until three days previous to death and then as I wrote you before."

[In the proceedings of the Sanitary Convention held under the auspices of the Michigan State Board of Health at Charlotte, Nov. 22 and 23, 1894, will be found an article on "Rabies—Hydrophobia" by Theo. R. Mac-

Clure, of Lansing, Michigan. The article was reprinted by the State Board of Health (Reprint No. 433) and is sent out from the office in response to requests for information concerning this disease. The article occupies over thirty pages of print and deals with subjects somewhat as follows:—Introduction, Early History, Causation, Symtoms in Animals, Symptoms in Man, Period of Incubation in Animals and in Man, Pasteur Preventive Inoculations (including statistics from the various Pasteur Institutes), Isolation of Infected or Suspected Animals, What should be done with a person bitten? etc.]

GLANDERS IN MICHIGAN IN 1894.

During the year ending Dec. 31, 1894, there were four outbreaks of glanders reported to the Secretary of the State Board of Health, from four localities in Michigan. In these outbreaks four cases, all horses, were reported to have occurred. Three of the four animals affected were shot to avoid spread of the disease. In addition to the above-mentioned cases, two cases of *suspected* glanders were reported.

The following extracts from correspondence of this Office give details relative to the above-mentioned outbreaks of glanders:—

Glanders in Kalkaska Village.

In his weekly card-report of sickness for the week ending Feb. 3, 1894, S. A. Johnson, M. D., mentioned a case of glanders in his vicinity.

Feb. 9, 1894, Secretary Baker wrote to Dr. Johnson as follows:—

"Accept thanks for your weekly postal-card report for Kalkaska and 'vicinity' for the week ending Feb. 3, 1894, on the margin of which you mention 'one case of glanders.' Will you have the kindness to inform me by return mail, whether the disease is in an animal, or whether a person is sick with it, and just what is being done to prevent the spread of the disease in either case."

"If the disease is in man, please inform me just how it was contracted, and all particulars of which you are cognizant relative to the subject.

"If the disease is not within your jurisdiction as health officer, please inform me where it is.

"I suppose you know that the law requires notice to be given to Hon. H. H. Hinds, President State Live Stock Commission, Stanton, Michigan."

In reply to the Secretary's letter, Dr. Johnson wrote, Feb. 4, as follows:—

"In regard to your letter would say, that I should have stated that the horse that is afflicted with it, is in the village. I have it in quarantine and have notified H. H. Hinds, of Stanton, Mich."

Feb. 20, a card was received at this Office from Dr. Johnson stating that the horse had been shot and buried six feet deep with two barrels of lime, and that no further case of the disease had appeared.

Glanders (in a horse) in Tecumseh Village, Lenawee Co.

The following postal card was received at this office, March 6, 1894, from F. O. Tefft, M. D., Health Officer of Tecumseh, Lenawee Co.:—

"There has been reported to me a case of glanders in a *horse* belonging to Geo. H. Keller of this village. I have had the animal isolated and have notified Mr. J. E. Barringer of the S. L. S. S. C. of Armada, Mich."

March 7, 1894, Secretary Baker replied to the above card as follows:—

"Please accept cordial thanks for your card of March 6, in which you give me notice of a case of glanders.

"I hope you will do all in your power to keep the disease from spreading, from animal to animal, or from animal to man. The glandered horse should be isolated, and great care should be taken that everything the horse, or the discharges from his nose may have come in contact with should be thoroughly disinfected; and, where practicable, infected articles should be destroyed by fire.

"* * * * * * . When the outbreak is over, will you have the kindness to give me a brief account of the measures taken. In how many animals the disease existed and whether the disease was spread to man, and any other facts you may have in your possession."

Nothing further was reported relative to this outbreak.

Glanders (in a horse) in Rich Township, Lapeer Co.

March 26, 1894, Horace Fox, Supervisor of Rich Tp., Lapeer Co., reported an outbreak of glanders in his jurisdiction, concerning which he wrote the folowing letter:—

"On March 22nd, —94, I was called upon by one Wm. Woodrow, of the township of R ch, Lapeer Co., Mich., to investigate a supposed case of glanders in one of his horses. I therefore took two competent veterinary surgeons, Gradnates of the Ontario Veterinary College and went to said Woodrow's to make examination. Upon a thorough examination it was pronounced a sure case of glanders. Said animal is a stallion, he was a well-bred horse and was traveled last season. It seems he was taken sick, or the owner noticed that he was not right, along about three months ago, he had a Quack doctor him all winter, who said there was no glanders or anything else that was contagious about the horse, until the owner got so uneasy himself that he thought he had better find out for sure. Upon our examination the owner said he would kill the animal immediately and he thought he would burn the cheap barn where he had wintered him, in order to disinfect his premises. Now what I want to know is if there is not some provision for paying this man partially for the loss of an animal in such a case.

"He is a very poor man financially and he has been honest and square in the matter in not taking the animal away from his place and exposing others. If you will kindly advise me in the matter * *."

In reply Secretary Baker referred Supervisor Fox to Hon. H. H. Hinds, Pres. of the State Live Stock Commission, and sent him copies of the Public Health Laws marked relative to glanders, and congratulated him and the people in that vicinity on the public spirited manner in which the owner of the horse had acted, in keeping the animal in quarantine. Later a letter was sent to this Office from Mr. Fox, requesting that it be forwarded to Hon. H. H. Hinds, which was done. Nothing further was heard from this outbreak.

Glanders (in a Horse) in Belding, Ionia Co.

June 14, 1894, a letter was received from Dr. F. B. Meloche, Health Officer of Belding, Ionia Co., containing inclosures, and which read as follows:—

"Being unable to obtain the address of the Secy. of the State Live Stock Commission I take this means to have the enclosed letter reach him. Will you be so kind as to mail the same and oblige."

Copies of the letters were taken for reference and were as follows:—

"*Belding, Mich., June 14, 1894.*

"Sect'y. State Live Stock Commission,

"Lansing, Michigan.

"DEAR SIR:—My attention having been called to a supposed case of glanders in a horse in my jurisdiction, I wish to state that I have asked the owner of said horse, who is a horse doctor but not a graduate, what the disease was and he said it was 'nasal gleet.' I demanded them a diagnosis from a veterinary and he brought me the enclosed certificate, which is signed by a non-resident and a non-graduate—both of these parties are non-graduates and very friendly now under these circumstances. The party that made the complaint and myself are not thoroughly satisfied that it is not glanders. I have consulted a veterinary from this city, a graduate, who says that he treated the said horse nearly a year ago for nasal gleet but got no satisfactory results and that it might be glanders now."

The certificate mentioned in Mr. Meloche's letter was as follows:—

"This is to certify that the mare owned by Mr. William D. Connor of your city is affected with nasal gleet and is not affected with glanders in any way. Said nasal gleet is not dangerous and not infectious.

"Respectfully,

"GEORGE A. HANKS."

On June 18, 1896, a postal card was received at this office from Dr. Meloche, concerning the outbreak of glanders, which read as follows:—

"A case reported to me as 'nasal gleet' in a horse on June 12th, 1894, turned out to be 'glanders' on investigation. The horse was killed and buried by the owner."

June 18, 1894, Secretary Baker wrote Dr. Meloche as follows:—

"Accept thanks for your information relative to the case of glanders, and that the animal was killed and buried.

"I trust that you will cause everything infected to be disinfected. This is very important. By this mail I send you a blank which is designed for final report of another disease, but may suggest to you some of the facts we should have about this case. I should be glad to have a 'final' report of it."

June 21, a "final report" was received at this office from Dr. Meloche, stating that the case had been thoroughly disinfected by burning the clothing which had come in contact with the animal, and by exposing the clothing of attendant to the fumes of burning sulphur; also that the horse was buried six feet deep.

No other case was reported as having been infected from this case.

Suspected Glanders (in a Horse) in Brookfield Township, Huron County.

A suspected case of glanders in Brookfield Tp., Huron Co., was reported at this Office December 8, 1894, by Dr. M. R. Lyman, health officer of Elmwood, an adjacent township. The outbreak upon careful investigation seems to have been a case of ulcerated teeth, the discharges from which came through the nostrils, thus giving the case the appearance of glanders. The case is one of some interest on account of the question of the authority of a health officer to quarantine against the entrance of such diseases into his jurisdiction. In this instance it seemed that the horse could not be moved conveniently from the town of Brookfield, except through the township of Elmwood, the jurisdiction of Dr. Lyman. Portions of the correspondence are given below, the outbreak *being* first reported by Dr. Lyman as follows:—

"A case of suspected glanders in a horse has been reported to me, the case however proved to be in the township of Brookfield, Huron Co., about 15 rods over the line from Elmwood township. I notified the board of health in that township to quarantine the case immediately and call a Vet. and have the case diagnosed. I also quarantined him (the owner) from bringing or sending the horse into the township of Elmwood.

"The health officer in the township of Brookfield will not do anything about it so I am told. Have I the power to quarantine the case and have it investigated if the other two officers on the board do not act, in Brookfield?

"The party in order to get out from his place has only about 15 rods to go to get into my jurisdiction and that is the only way he can get out. The horse is in an old hut of a stable where there were glanders two years ago and the horse was killed."

A copy of Dr. Lyman's letter was handed to Hon. H. H. Hinds of Stanton, President of the State Live Stock Commission, and on December 12 the following answer was sent from this Office to Dr. Lyman:—

"Glanders is a 'disease dangerous to the public health,' and a disease which affects man as well as animals. The health officer of Brookfield township should restrict the disease in accordance with Act 137, Laws of 1883. Great care should be taken by the local board of health, to see that the disease is not spread to other animals and especially to man. The danger is from the discharges from nose and throat. Strict isolation of the case should be enforced until the State Veterinarian takes charge of the case. Under no circumstances should the local board of health fail to guard the public health and safety from this fearful disease.

"If you have reported the disease to the health officer of Brookfield Tp., you are relieved from further action, *in that township.*

"As regards your quarantine against this horse affected with glanders, I understand from your letter that you have already given your orders that the horse be not brought into your township, I think *perhaps* that is sufficient, except that you should *let it be fully understood that you have given your orders under the law*, and that whoever disobeys is liable to prosecution and penalties."

The Secretary of this Board also wrote, December 10, to Ephraim McCullough, Health Officer of Brookfield township, informing him of the notification of glanders in his jurisdiction, and urging him to follow the directions of the law in such cases and requesting a complete and immediate report. December 15, 1894, a letter was received at this Office from Health Officer McCullough in answer to the letter from the Secretary, which read as follows:—

"As soon as I was notified I went and quarantined the horse until I got a good practical veterinary and he pronounced it a case of ulcerated teeth; he said there was no glanders there and he is a man that has had good experience. I inquired about that case of glanders you were informed about two years ago, and as far as I can learn starvation was the starting point of the trouble."

Dr. Lyman wrote this Office on December 14, relative to the result of the investigation, as follows:—

"The case of suspected glanders has been diagnosed by a Vet. as caries of the superior maxillary, caused from decayed teeth and the discharges have corroded their way through the tissues into the nostrils."

HOG CHOLERA IN MICHIGAN IN 1894.

During the year ending December 31, 1894, the reports of two outbreaks of hog cholera in Michigan came to the knowledge of this Office. Information concerning the outbreaks is as follows:—

Outbreak in Lansing Township, Ingham Co.

May 19, there appeared in the columns of the "State Republican" the following:—

"Hog cholera or some kindred disease has killed all but nineteen of a drove of sixty hogs owned by Baumgart & Johnson.

"Several weeks ago the fact of the death of certain hogs by some contagious disease was reported to State Veterinarian Grange. Nothing was done by the veterinarian except to refer the owners to the president of the live stock sanitary commission, H. H. Hinds of Stanton.

"Accordingly Messrs. Baumgart & Johnson wrote to Mr. Hinds and received a letter in reply stating that the animals were probably affected with hog cholera, or swine plague, and that they would probably be out of hogs in a short time. A few days afterward Mr. Hinds was in Lansing and examined the hogs, pronouncing the disease hog cholera or swine plague. Mr. Hinds directed that the hogs be kept together where they were then, but nothing further has been done to secure the safety of the other droves in the neighborhood. The infected drove is kept in a 40-acre field just west of the college, lying between Michigan avenue and the old gravel road, upon both of which thoroughfares there is a great deal of travel.

"The hogs are at large in the field and neighboring farmers are greatly alarmed about the safety of their stock. Both the hog cholera and swine plague are contagious diseases capable of spreading over a district with great rapidity. The hogs are fed on such food as their owners are able to gather in the city. The food is thrown onto the ground in the field and attracts birds and stray dogs, so that every facility exists for communicating the disease.

"The law of the State makes it the duty of the local board of health to investigate such cases as this and to establish a quarantine to prevent the spread of the disease. If in the opinion of the commissioner it is necessary, the infected animals may be killed and the expense paid out of the state treasury, and a general feeling exists among interested parties that some more stringent measures ought to be taken to prevent the spread of the disease.

"Dr. Grange was seen with respect to the matter. He said that so far as he was concerned he had no authority in the premises. Whatever he could do would be to express his opinion as to what ought to be done, the final disposition of the case being for the sanitary commission. He did not think that it was customary in such cases to do anything more than isolate the infected animals. He said that it was probably true that birds might carry the disease to great distances.

" ' If the neighbors thereabout think,' said the doctor, 'that Baumgart is not taking proper care of the diseased hogs, or if they are not satisfied with the present condition, they should inform the commission. Then, if it is true that the hogs are not properly cared for, the commission will very likely kill them.' "

May 21, the Secretary of this Board wrote O. V. Reeves, Health Officer of Lansing Tp. as follows:—

"In the Lansing Republican of May 19, appears a long article about 'Hog Cholera' in Lansing Tp., near the Agricultural College, on a farm. The hogs are owned by Messrs. Baumgart and Johnson, on the road between North Lansing and the Agricultural College.

"I send you herewith a copy of the law relating to the duties of the local health officer, and local board of health in cases of outbreak of infectious diseases in animals. The local board, or any member thereof, shall immediately investigate, either in person or by a qualified person appointed by said board, and if a contagious or infectious disease is found to exist, the facts should immediately be reported to the President of the State Live Stock Commission, Hon. H. H. Hinds, of Stanton, and the local board of health shall promptly take such action as it may deem necessary to prevent the spread of the disease, until the commission relieves it from the charge of such animals.

"I shall be glad to hear from you with reference to just what action the local board has taken. If you have not already notified the president of the live stock commission, you should immediately do so."

Outbreak of Hog Cholera at Pontiac, Michigan.

September 27, the Secretary wrote to Prof. E. A. A. Grange, State Veterinarian, as follows:—

"Dr. McClintock, of the State Laboratory of Hygiene, Ann Arbor, informed me that he forwarded to you the tubes you wish to use in your tests for tuberculosis, in animals, in connection with the cases under your observation at Pontiac; and in a late letter expresses his willingness to do anything further to aid in the work at that place which may be found necessary. I would be glad to learn what the result of your observations relative to said cases has been.

"I would also be glad to be informed if you wish Doctor McClintock to present his bill for the tubes to you or to this Board."

September 29, Dr. E. A. A. Grange wrote Secretary Baker as follows:—

"I am sorry that the tubes did not reach me before I had completed my investigation at Pontiac. I have already written Dr. McClintock. There was not any evidence of Tuberculosis in the hogs that I held autopsies upon. The disease appeared to be (beyond all doubt) swine plague.

"With regard to Dr. McClintock's bill, it was a case of 'pro bono publico', so I hardly know which board he should present it to, though I do not suppose it will be very much for 6 tubes of Blood serum. I will certify to it if he sends it to me or if you think it will simplify matters to have it charged to your board why I think that would be highly proper."

In former years there has seemed to be a relation between the occurrence of hog cholera among animals and a disease slightly resembling typhoid fever in man. Nothing definite has ever been proved on this subject; but record is kept of outbreaks of hog cholera among animals in order to learn whether or not it has any relation to any sickness in the human species.

LUMP-JAW (ACTINOMYCOSIS) IN MICHIGAN IN 1894.

During the year ending December 31, 1894, there were 9 cases (including alleged cases) of Lump-Jaw in animals reported to this office from the following named places:—Onondaga Tp., Ingham Co.; Wheatland Tp., Mecosta Co.; Menominee city, and Rockland Tp., Ontonagon Co.

During the previous year only one case was reported to this office.

The correspondence of this Office relative to the cases of Lump-Jaw in the year 1894 is as follows:—

Outbreak of Lump-jaw in Onondaga Tp., Ingham Co.

Under date of October 27, the Supervisor, Pomeroy VanRiper, wrote as follows:—

"There are some cattle in this town owned by W. O. Stone that I understand the State Veterinarian pronounced to have Lump-Jaw and the people here are alarmed about it, and are coming to me every day and inquiring what can be done about it. I did not see the State Veterinarian when he was here. I was in Mason on the Board of Supervisors, but Mr. Stone says that he said it was Lump-Jaw and they ought to be killed; but that the State did not pay for such cattle now that they were killed, and he will not kill them if he has to lose their full value. His neighbors are very anxious to have them killed as there are quite a good many cattle near him. I understand that there are four of these cattle affected with the disease.

"Can you advise anything to be done in this case? And is it a fact that the State does not pay for such cattle destroyed?

"An early reply will greatly oblige."

In absence of Secretary Baker, Correspondence Clerk T. R. MacClure, October 29, replied as follows:—

"Your letter of Oct. 27, relative to lump-jaw (actinomycosis) came during Dr. Baker's absence from this Office attending the Union City Sanitary Convention. You should also have notified the President of the State Live Stock Commission, Hon. H. H. Hinds, Stanton, Michigan. In this case, however, I have made a copy of your letter, and sent it to Hon. H. H. Hinds. He will probably write you soon.

"Whether in man or animals, any dangerous contagious disease should be reported to the Office of the State Board of Health, and the local health authorities should not fail to guard the public health and life. By Lump-jaw I understand 'actinomycosis' a disease dangerous to man as well as animals. The animals affected should be isolated from all other animals and from the public.

"By mail I send you a copy of the Work of Health Officers, on pages 3 and 6 of which I have marked parts bearing upon the duties of the local board of health. I also send a copy of the Stanton Sanitary Convention, in which I have marked a paragraph bearing upon the subject of actinomycosis."

Supposed case of Lump-jaw in Wheatland Tp., Mecosta Co.

Under date of March 10, Dr. G. W. DeClements, health officer, wrote to the Secretary of this Board as follows:—

"I write you for information in regard to a supposed case of Lump-jaw in some cattle which I find in this township.

"As I am in the dark in regard to the duties of the health officer in such a case, please inform me what I shall do. The case is as follows: The person had two bulls, and one of them had a large swelling under the lower jaw in this shape 'U' and finally had to kill same and sold meat. After that he put the other bull in the stall, which the other one had occupied, and now it has a large swelling on the under side of the lower jaw, which looks like a hornet's nest. This is as near as I can describe it.

"Hoping to hear from you soon, I remain."

In reply, Secretary Baker, March 13, wrote substantially as in the letter to Pomeroy VanRiper, but continued by saying:—

"On page 65 of the Public Health Laws, I have marked a paragraph which provides that any person who knowingly disposes of any animal affected or infected with a dangerous disease shall be deemed guilty of a misdemeanor and upon conviction thereof shall be fined not less than ten nor more than one hundred dollars, on page 69 I have marked section 9316, Howell's Statutes, which provides a fine of not more than two hundred dollars for knowingly selling any kind of diseased, corrupted, or unwholesome provisions, whether for meat or drink, without making the same fully known to the buyer. The meat from an animal dead of or suffering from lump-jaw should certainly not be used for human food, unless it is known to be thoroughly cooked. The parasites may be in other parts of the body as well as in the head.

"Herewith I enclose a stamped envelope. Will you have the kindness to inform this Office of any new developments in this outbreak, and just what measures were taken in the restriction of this disease?"

Outbreak of Lump-jaw in Menominee city.

March 24, Dr. H. L. Rosenberry, Health Officer of the city wrote to Secretary Baker as follows:—

"I heard today of a milch cow having actinomycosis. The cow is in a herd of S. M. Stephenson. They do not sell milk so I do not know as I have any authority to kill her. Dr. H. P. Clute of Marinette, Wis., reported the case during conversation.

"Could the State Veterinarian come here and examine and condemn her?"

Secretary Baker's reply was substantially the same as his reply in regard to the preceding cases.

Concerning a new outbreak near Menominee, Dr. W. R. Hicks (successor to Dr. H. L. Rosenberry as health officer) wrote to the Secretary, November 27, as follows:—

"There is a case of actinomycosis in a cow, about five miles out of the city. The owner has a herd of cows from which he sells milk in the city. The diagnosis was made by a Veterinary Surgeon. I have not seen the animals.

"The cow has been isolated and the balance of the herd is being closely watched.

"I think probably the diagnosis is correct but I have little knowledge of the disease and report to you for advice and instructions."

In reply to Dr. Hicks' letter after writing as in the preceding cases, Secretary Baker, under date of Nov. 30, continued as follows:—

"In March this year Dr. Rosenberry reported a case in the herd of S. M. Stephenson, and I shall be glad to know if there is any connection between these two outbreaks—the one reported by Dr. Rosenberry, and the one reported by yourself.

"Will you kindly give me any additional information you may be able to give me.

"As the disease is a specific parasitical disease, great care should be taken that it does not spread. I would not believe it altogether safe to use the milk from an infected cow.

"P. S.—In Wood's Reference hand book of Medical Sciences, Vol. I, pages 70-71, is an account of the nature of the fungus, which causes actinomycosis, and how the disease spreads."

Concerning this outbreak, a letter dated December 5 was received from Dr. Hicks which read as follows:—

"Your note in relation to actinomycosis received yesterday. I have learned that the cow having the disease was raised by the present owner. It has never been off his farm, and to his knowledge no animal having the disease was ever on his pasturage. His farm is about five miles above the Stephenson farm and I think that there has been no contagion from that source. I have asked him to keep the animal isolated and alive until I learn whether or not the State Veterinarian will visit it.

"If I do not hear from him soon will ask owner to kill and destroy the cow."

Under date of December 17, Dr. Hicks wrote as follows:—

"I have heard nothing from Mr. Hinds or the State Veterinarian in regard to the case of actinomycosis.

"The owner is getting impatient to have some disposal made of her. I have promised him that if we do not hear from the Veterinarian soon, we will have cow killed and her carcas burned.

"He thinks that the State will reimburse him for the loss of the cow. Is there any provision made for such cases?"

Secretary Baker's reply of December 19, reads as follows:—

"Your letter of Dec. 17, relative to the case of actinomycosis and not having heard from Mr. Hinds,—the reason you never heard from him, is, I think, because our records in this office show that a copy of your letter of Nov. 27, was probably never sent to Mr. Hinds, as I told you I had done in my letter to you of Dec. 1. I am sorry there has been such delay.

"Mr. Hinds happened in the Office this morning when your letter was received, and requested that I make a copy of each of your letters, and he would call for them and see that they had immediate attention. I have had copies made; and, if Mr. Hinds does not call, they will surely be sent to him at Stanton, without delay. You will probably hear from him in a few days.

"I understood from Mr. Hinds' conversation, that the State Live Stock Commission did not condemn animals suffering from actinomycosis, as they believed it to be a curable disease, but he will undoubtedly answer all your questions. I believe you should keep the cow isolated until you hear from him."

Outbreak of Lump-jaw at Rockland, Ontonagon Co.

February 9, Dr. W. C. Gates, Health Officer, wrote as follows:—

'I have just discovered a case of what I believe to be actinomycosis or lump-jaw in a young heifer here.'

"As the Medical Journals gave me the impression that it was communicable, I write to you for instructions. Are there no publications on this subject outside of Journals? Does the U. S. Government issue any publications on it and how can I obtain them if it does?"

Secretary Baker, under date of February 12, replied as follows:—

"Accept thanks for your letter of February 9, quoting a case of supposed actinomycosis. Such diseases are required to be reported to the State Live Stock Commission, of which Hon. H. H. Hinds of Stanton, Mich. is the president. I believe it is a communicable disease, but not frequently communicated to the human species. I suppose it may be communicated by dried beef or other uncooked meat containing the germs of this disease.

"If you apply to the 'Bureau of Animal Industry, Department of Agriculture, Washington, D. C.', for a publication on this subject, you will probably receive a copy. Dr. D. E. Salmon is the chief of the Bureau. You might mention, in writing to him, that you think you have discovered a case."

INJURIES AND LOSS OF LIFE AND PROPERTY ALLEGED TO HAVE BEEN CAUSED BY THE USE OF KEROSENE, IN MICHIGAN, DURING THE YEAR ENDING DECEMBER 31, 1894.

Continuing a practice pursued in previous years, the office of the Secretary of the State Board of Health, has, during the year 1894, sought to obtain information relative to each casualty, alleged to have been caused by the use of kerosene, which came to the notice of said office.

The principal sources from which this office obtains facts in regard to such casualties as above mentioned, are four, viz.: from reports by the Fire Marshal of Detroit, State Inspectors and Deputy Inspectors of Illuminating Oils, Local Health Officers, and from newspaper reports. Relative to the last of these sources of information, it should be stated that the Secretary of this Board does not accept as necessarily authentic, newspaper reports of casualties from the use of kerosene. When such reports come to his knowledge, he applies to the proper officials of the localities in which they are said to have occurred, for confirmation or contradiction of the reports, and for any information which these officials may be able to give in connection with the alleged casualties. A copy of the form of letter used on such occasions, is given in the Annual Report of this Board for the year 1892, page 334. The data collected from these sources show that during the year 1894, information was received at this office, of the occurrence of 64 casualties consequent on the use of kerosene in Michigan. These casualties were reported to have occurred in 10 localities, causing loss of 9 lives, injury (non-fatal) to 5 persons, and damage of property to the amount of $20,374.

This reported damage does not include all the actual pecuniary loss occasioned by the above-mentioned casualties, because in some instances where houses, barns and other property were destroyed the loss was not reported.

TABLE 1.—*Casualties in Michigan during the year 1894, believed to have been consequent on the use of Kerosene, information of which was received at the Office of the Secretary of the State Board of Health. In this year the legal test was a Flash Test at 120° Fah., in a Foster Automatic Tester.**

	Number of Casualties.	Number of Localities.	Pecuniary losses, Dollars.	Lives lost.	Persons injured (not fatally).
In Detroit	55	1	18,844	3	2
In State (outside Detroit)	9	9	1,530	6	3
Totals	64	10	20,374	9	5

*In 1893, the legal test of kerosene, for illuminating purposes, was, by legislative enactment (Section 2, Act 94, Public Acts of 1893) made as follows: "It shall be the duty of the inspector and his deputies to provide themselves at their own expense with the necessary instruments and apparatus for testing the quality of said illuminating oils, and when called upon for that purpose to promptly inspect all oils hereinbefore mentioned, and to reject for illuminating purposes all oils which will emit a combustible vapor at a temperature of one hundred and twenty degrees of Fahrenheit's thermometer: *Provided*, The quantity of oil used in the flash test shall not be less than half pint. The oil tester adopted shall be the Foster automatic tester cup, with the lighted wick placed inside the tube, and under the thimble which shall be used by the inspector and his deputies." Act 94 became operative July 1, 1893.

Casualties from the Use of Kerosene in 1894 Compared with Previous Years.

TABLE 2.—*Exhibiting the numbers of casualties believed to have been consequent on the use of Kerosene* in Michigan (*including the city of Detroit*), *information of which was received at the office of the Secretary of the State Board of Health in each of the six years, 1889–1894.**

Year.	Number of Casualties.	Amount of damage done, Dollars.	Number of Lives lost.	Number of Casualties caused by Lamp explosions.	Number of Casualties caused by Stove explosions.
1889	58	† 74,049	8	16	2
1890	55	18,282	2	22	6
1891	148	52,328	11	98	8
1892	124	66,000	7	75	17
1893	88	49,500	2	48	15
1894	64	20,374	9	29	1

* In the years 1889, 1890, and the first half of 1891, the legal test was a Flash test at 120 degrees Fah., in a closed tester; and in the last half of 1891, in 1892 and the first half of 1893, it was a Burning test at 120 degrees Fah., in an open tester, which, because it varies greatly, is equal to a Flash test of from 95 to 110 degrees Fah., probably averages about equal to a Flash test of 100 degrees Fah., in a closed tester, like the one approved by the State Board of Health. The last half of 1893, and in 1894 the legal test was a Flash test at 120° Fah., in the Foster Automatic Tester, which has not been approved by the State Board of Health.

TABLE 3.—*Exhibiting the number of casualties believed to have been consequent on the use of Kerosene* in Detroit *during each of the years, 1889–1894. (Reported by the Fire Marshal of Detroit to the Office of the State Board of Health.) The legal est of Kerosene in each year is explained in the * footnote to Table 2 of this article.*

Year.	Number of Casualties.	Amount of damage done, Dollars.	Number of Lives lost.	Number of Casualties caused by Lamp explosions.	Number of Casualties caused by Stove explosions.
1889	35	† 65,250	3	14	2
1890	44	18,282	0	15	6
First six month of 1891	14	2,878	0	9	2
Last six months of 1891	41	9,760	2	26	5
Total for year 1891	55	12,638	2	35	7
1892	79	39,306	2	37	13
First six months of 1893	37	20,958	0	19	10
Last six months of 1893	34	18,536	0	19	5
Total for year 1893	71	39,494	0	38	15
1894	55	18,844	3	28	1

† The total reported damage for 1889 includes, $40,000 damage caused by a single fire at 678 Jefferson street. The fire was caused by careless manipulation of an oil heater used for heating a conservatory, and "was not the result of the grade of the oil used."

TABLE 4.—*Exhibiting the number of casualties believed to have been consequent on the use of Kerosene* **in Michigan** *(including the city of Detroit), information of which was received at the office of the Secretary of the State Board of Health in each of the six years, 1889–1894. The legal test of Kerosene in each year is explained in the *footnote to Table 2.*

Year.	Number of Casualties.	Amount of damage done, Dollars.	Number of Lives lost.	Number of Casualties caused by Lamp explosions	Number of Casualties caused by Stove explosions.
1889	53	* 74,049	8	16	2
1890	55	18,282	2	22	6
First six months of 1891	† 30	10,778	2	* 19	2
Last six months of 1891	† 118	42,050	9	* 74	6
Total for year 1891	148	52,828	11	93	8
1892	134	66,106	7	75	17
First six months of 1893	43	25,958	0	21	10
Last six months of 1893	40	23,542	2	22	5
Total for year 1893	83	49,500	2	43	15
1894	64	20,374	9	29	1

* The total reported damage ($74,049) for 1889 includes, $40,000 damage caused by a single fire at 678 Jefferson street, Detroit. The fire was caused by a careless manipulation of an oil heater used for heating a conservatory, and "was not the result of the grade of the oil used."

† Included in these numbers are data relative to 27 reported casualties in 1891, of which the exact dates of occurrence were not reported. In order to make an equitable distribution of these between the first and last halves of the year a proportionate division of them is made, based on the data contained in Table 2 of this article, thus: Table 2 shows that, *exclusive* of the above-mentioned 27 casualties, there were reported 121 casualties in the State, in 1891; that 24 (about 20 per cent) of these, occurred in the first half of the year, and 97 (about 80 per cent) occurred in the last half of the year. The 27 casualties, the dates of which are not given, are divided between the first and last halves of the year in the same proportion, that is, 20 per cent of them are added to the first half, and 80 per cent to the last half of the year.

The foregoing three tables (2, 3 and 4), based, for 1894, on the data from which Table 1 in this article is constructed and for 1889, 1890, 1891, 1892 and 1893 on similar data for those years, are designed to facilitate comparison of the number of casualties and the resultant damages, which occurred in the State from the use of kerosene during those years.

The following lists of casualties show the localities in which the casualties occurred, the nature of each casualty, the damage caused thereby, and whatever other details in regard to them this Office has been able to collect.

List of Casualties consequent on the use of Kerosene in Michigan outside the city of Detroit, calendar year 1894.

Date in 1894.	Locality.	Nature of Casualty.	Amount of Damage, Dollars.	Injury to Person.
Jan. 2	Kalamazoo City	Fallen lamp		Woman fatally burned.
Jan.	Potterville Village	Broken lamp		Woman severely burned.
Mar. 7	Batavia Twp.	Overturned lantern	1,500	Man fatally burned.
July 9	Pinkney Village	Kindling fire with kerosene	25	Woman severely burned.
July 19	Osceola Twp.	Overturned oil stove		Woman fatally burned.
Aug. 22	Palmyra Twp.	Fallen lamp		Woman fatally burned.
Oct. 21	West Bay City	Broken lamp		Woman fatally burned.
Nov. 13	Ann Arbor	Lamp exploded		Henry Binder fatally burned.
Nov. 15	Grand Rapids	Hanging lamp fell	5	Child severely burned.

List of Casualties consequent on the use of Kerosene, in Detroit, Calendar Year, 1894. (Supplied by William H. Baxter, Fire Marshal in Detroit.)

Date in 1894.	Street and Number.	Nature of Casualty.	Amount of Damage, Dollars.	Injury to Person.
Jan. 1	639 Michigan	Lamp exploded	550	
Jan. 4	648 Michigan	Stove exploded	3,035	
Jan. 7	733 Elizabeth E.	Lamp exploded	463	
Jan. 24	341 Sixth	Lamp exploded	137	
Jan. 25	422 St. Antoine	Lamp upset	252	
Feb. 6	343 Canfield East	Careless use of lamp	119	
Feb. 12	1016 Michigan	Leaking stove	15	
Feb. 20	1123 Farnsworth	Lamp exploded	92	
Feb. 26	241 Jefferson	Lamp leaked	18	
Mar. 10	316 Fort West	Stove upset	40	
Mar. 16	586 Beaubien	Lamp set fire to clothing	450	
Mar. 22	231 33rd	Lamp exploded	438	
Apr. 7	104 Myrtle	Lamp exploded	260	
Apr. 24	424 Grandy	Lamp exploded	1,316	
Apr. 27	1122 Russell	Lamp exploded	291	
May 31	729 Medbury	Lamp suspended too close to woodwork	433	
June 4	275 Greenwood	Lamp upset	451	
June 11	444 Sherman	Lamp exploded	350	
June 11	363 Hastings	Lamp exploded	241	
June 12	453 Hastings	Lamp fell	80	
June 22	151 Canfield East	Lamp exploded	952	
June 23	54 Bagley	Lamp upset	30	
June 26	233 Franklin	Lamp exploded	25	

List of Casualties consequent on the use of Kerosene in Detroit.—CONCLUDED.

Date in 1894.	Street and Number.	Nature of Casualty.	Amount of Damage, Dollars.	Injury to Person.
June 29	156 Warren West	Lamp upset	72	
July 20	889 Mitchell	Lamp exploded	154	
July 22	386 Larned East	Careless use of lamp	264	
July 27	12 Fox	Lamp exploded	550	
Aug. 5	292 Grandy	Lamp exploded	25	
Aug. 6	141 Elizabeth East	Lamp exploded	65	
Aug. 7	321 Locust	Lamp carried too close to clothing	105	
Aug. 8	71 Warsaw	Lamp exploded	164	
Aug. 11	169 Michigan	Lamp broken	2,050	
Aug. 14	785 Fifteenth	Lamp upset	197	
Aug. 14	890 Jefferson Ave.	Oil ignited while being poured into washboiler		Woman fatally burned.
Aug. 14	428 Monroe	Lamp exploded	410	
Aug. 20	164 Park	Lamp exploded	634	
Aug. 27	104 Myrtle	Lamp fell from bracket	310	
Aug. 30	167 Gratiot	Lamp exploded	423	
Sept. 6	180 Abbott	Lamp exploded	459	
Sept. 12	274 Woodward	Lamp fell	87	
Sept. 25	243 Buchanan	Light too near	690	
Sept. 29	213 Larned East	Lamp exploded	51	
Oct. 9	33 Bagley	Lamp shade took fire from lamp	22	
Oct. 9	234 Columbia East	Lamp exploded	168	
Oct. 21	356 Macomb	Stove leaked	147	
Nov. 9	11 Breckenridge	Lamp exploded	123	
Nov. 9	347 Townsend	Lamp too near clothing	360	
Nov. 11	230 St. Antoine	Lamp fell	106	
Nov. 16	280 Bellevue	Lamp exploded	7	Woman fatally burned.
Nov. 25	41 Witherell	Stove collapsed	100	
Dec. 9	225 Woodward	Lamp exploded	180	
Dec. 15	554 Michigan	Lamp fell	391	
Dec. 17	154 Larned East	Lamp accidentally broken	15	
Dec. 20	167 Gratiot	Lamp exploded	105	
Dec. 27	1298 Eighteenth	Leaking stove	130	
Dec. 28	104 Myrtle	Lamp exploded	259	

Table 2, which is a summary of the data contained in Tables 3 and 4 shows that in the *State, including* the city of Detroit, there were reported to have occurred 64 casualties, resulting in pecuniary losses amounting to $20,374.00, and the loss of lives of 9 persons. Twenty-nine (about 45 per cent) of these casualties were attributed to lamp and lantern explosions, and one (about 1.5 per cent) to oil-stove explosions.

The remaining 34 casualties were attributed to other causes as follows:—Lamps upset, 6; fallen lamps, 8; broken lamps, 4; lamps held too close to clothing, 3; stoves upset, 2; stove collapsed, 1; kindling fire with kerosene, 1; lamp placed too near woodwork, 1; other careless usage of kerosene, 8.

In tables 3 and 4, the years 1891 and 1893 are divided into two parts, one comprising the first six months and the other the last six months of those years. The reason for this division is, that the laws regulating the legal test of kerosene in the State were, by legislative enactment, changed during those years, the new laws becoming operative on July first of each of those years. This arrangement of tables 3 and 4, therefore, gives opportunity not only for comparison of the prevalence of casualties in 1891 and 1893 with the other years; but also of the comparative prevalence of casualties in the first and last halves of 1891 and 1893, under the provisions of the old and new test laws.

In 1889, 1890 and the first six months of 1891, the legal test of kerosene in this State was a *Flash* test at 120 degrees Fah. in a *closed* tester, approved by the State Board of Health; that is, that the sale and use of oils which, in a *closed* tester, similar to a lamp, would emit an explosive vapor at a temperature lower than 120 degrees Fah. was prohibited. The law, which took effect July 1, 1891, made the legal test a *Burning* test at 120 degrees Fah. in an *open* tester, not approved by the State Board of Health. That is, the law of 1891 prohibited only the sale of kerosene which would *burn* in an *open* tester at a lower temperature than 120 degrees Fah. As kerosene will emit an explosive vapor at a much lower temperature than that at which it will continue to burn in the open air where the vapor is carried away as fast as formed, and because of the variations in tests in an *open* tester, dependent on varying atmospheric currents and conditions, it is believed that the new *burning* test, at 120 degrees Fah. would probably average not more than equal to a *Flash* test at 100 degrees Fah. in a *closed* tester, like the "State Board of Health Tester." That is to say, that an oil which would burn at a temperature of 120 degrees Fah. in an *open* tester, would probably, when heated to a temperature of 100 degrees Fah. in a *closed* tester, emit explosive gas which would flash; although the same oil if heated in an *open* tester, might, under some conditions, not flash at a temperature lower than 110 degrees Fah.

In a series of 64 experiments made by Dr. R. C. Kedzie,* with kerosene obtained from various sources, it was found that oils, the average *burning* temperature of which was 128 degrees Fah., *flashed* at an average temperature of 117 degrees Fah. Based on the same proportion, oils which would *burn* at 120 degrees Fah. would emit explosive gas which would *flash* at a temperature of 109.7 degrees Fah.

Experiments made by Prof. Chandler† to ascertain the temperature of kerosene in lamps after they had been burning a number of hours, showed that in one instance he found the temperature 120 degrees, in another 118 degrees, and in another 104 degrees; an average temperature for the three instances of 114 degrees, which is 4.3 degrees higher than the average *flashing* point of oils, the average *burning* point of which is 120 degrees Fah. These experiments seem to show that oil in burning lamps some-

* Published in the First Annual Report (1873), of the Secretary of the Michigan State Board of Health, pages 44 and 45.

† First Annual Report, (1873), of the Secretary of the Michigan State Board of Health, page 55.

times attains a higher temperature than the *flashing* point of oils, whose *burning* point is 120 degrees Fah. It would therefore seem that oils which would meet the requirements of the Michigan legal test, established in 1891, may, in burning lamps, attain a higher temperature than that at which they would emit explosive gas, and are, therefore, dangerous; for, no oil can be considered safe for illuminating purposes which will give off an inflammable vapor at the highest temperature reached in lamps. This assumption—based upon experiments—that oils passing this legal test are unsafe, seems to be demonstrated by actual experience collected in tables 3 and 4, which show, both in the city of Detroit and in the whole State, that there was a large increase in the number of casualties from the use of kerosene in 1891 and 1892 over 1890, and that as regards 1891 this was caused by the increase in the number which occurred in the last half of that year

The Legislature of 1893, realizing that illuminating oils which would pass the legal test established by the Legislature of 1891, were unsafe, and a menace to the lives and property of the citizens of the State, enacted a new law (Act 94, Public Acts of 1893), which appeared to, but did not actually re-establish the legal test in force prior to the change in 1891. Instead of requiring the test to be made in a "State Board of Health Tester," the law requires it to be made with a patent tester, through which a current of air is caused to pass, over a lighted taper, thus distilling off vapor so gradually that the oil does not flash at as low a temperature as the same oil would in a "State Board of Health Tester."

Section 2 of this law, which became operative July 1, 1893, reads as follows:—

"SEC. 2. The State Inspector provided for in this act is hereby empowered to appoint a suitable number of deputies: *Provided*, That the number of said deputies so appointed shall not exceed twenty-two, which deputies are hereby empowered to perform the duties of inspection and shall be liable to the same penalties as the State Inspector: *Provided*, That the State Inspector may remove any of said deputies for reasonable cause. It shall be the duty of the inspector and his deputies to provide themselves at their own expense with the necessary instruments and apparatus for testing the quality of said illuminating oils, and when called upon for that purpose to promptly inspect all oils hereinbefore mentioned, and to reject for illuminating purposes all oils which will emit a combustible vapor at a temperature of one hundred and twenty degrees of Fahrenheit's thermometer: *Provided*, The quantity of oil used in the flash test shall not be less than half pint. The oil tester adopted shall be the Foster automatic tester cup, with the lighted wick placed inside the tube, and under the thimble which shall be used by the inspector and his deputies."

In considering the effect of the legal test of kerosene on the number of casualties resulting therefrom, it is noticeable, as shown in Table 4 of this article, there has been a decrease of casualties since the present law went into operation; still the number of casualties in 1894 is greater than it was in years before the test was lowered in 1891. This may be due to the fact that the tester cup used in 1889 and 1890 required a higher grade kerosene to pass the test of 120 degrees Fah. than does the Foster cup now in use. The present test of 120° F. by the Foster cup permits the use of kerosene which tested by the old, State Board of Health tester would flash at several degrees below 120° F.

PERSONAL INJURIES CONSEQUENT ON THE USE OF KEROSENE.

The following extracts from correspondence of this office, and from newspaper items, which came to the notice of the Secretary of this Board, give in detail the circumstances connected with some of the casualties from the use of kerosene, which resulted in loss of human life and other personal injuries to citizens of this State in 1893:—

Woman Fatally Burned by Kerosene in Kalamazoo City.

The "Detroit Tribune" of Jan. 4, 1894, contained the following item:—

"Kalamazoo, Mich., Special, Jan. 2.—The home of Mrs. Haddon on Ransom street was slightly damaged by fire tonight and Mrs. Haddon was fatally burned by blazing oil."

In response to inquiries from this office, Adolph Hockstein, M. D., health officer of the city, wrote relative to this casualty as follows:—

"The deceased in question, Mrs. Haddon, had a stroke of paralysis 2 years ago, from which she had not fully recovered. On the night of the fatal accident she was left alone by her husband and daughter for a few minutes, sitting in a chair and reading, two lamps standing on the table. When the husband returned, he found the woman on the floor, all the clothes burned off her body, seven-eighths of the surface of the body being blistered, one lamp still standing on the table, the other one with the chimney broken had fallen to the floor but was still burning. No explosion, kerosene used, carpet and some furniture were set on fire. The woman when found was semi-conscious."

Woman Severely Burned by Kerosene in Potterville Village.

The following paragraph appeared in the "Detroit Tribune" of Jan. 17, 1894:—

"Potterville: Mrs. Lucy Granger Wagner was enveloped in the flames of an overturned lamp. The woman is a cripple. Her left foot was burned so the flesh came off, and she may die. Neighbors saved her and her little child from destruction."

In reply to the usual inquiries from this office, Dr. E. R. Espie, health officer of the village, wrote:—

"The lady dropped the lamp at her feet breaking the lamp and setting fire to the oil and her clothing; left foot badly burned, and limb, also lower third, lower arm and hand badly burned; also several quite severe burns on the back. She will perhaps get well."

Man Fatally Burned in Batavia Township (Supposed) by Kerosene.

The following item, from the "Detroit Free Press" of Mar. 8, 1894, was reported to this Office as substantially correct, by Philip Pitcher, health officer of Batavia township, where the casualty occurred:—

"Coldwater, March 7.—This morning between 4 and 5 o'clock M. S. Nixson, of Batavia township, was burned to death. He was preparing to move today and arose quite early and went to the barn to do the chores. The fire was not discovered until the barn was all ablaze, and no one knew that he was in it until his body was seen to fall into the basement. How the fire originated is not known, but as he started out with a lantern, some accident must have happened whereby the lantern was upset. A large quantity of hay, grain, and farming implements was burned, and also a number of cows and thirty sheep. The total loss is $1,500."

Woman Fatally Burned in West Bay City.

Relative to a casualty which occurred in West Bay City, and about which inquiry was made from this Office, the health officer of the city, A. G. Bissell, M.D., wrote:—

"Replying to your letter of Nov. 30th regarding the accident to Mrs. Newton, I have to say that the following from Mrs. Newton's mother-in-law, who was with her at the time, is no doubt correct. The accident happened in a tent just before religious services were to have been held. The lamp commenced to smoke and soon flamed high. Mrs. Newton caught it up and threw it out of the tent door and nearly hit a man outside who either kicked or struck the lamp with a stick or umbrella hurling it back into the tent and throwing the burning oil over the skirts of Mrs. Newton. They being light and inflammable quickly took fire and before it could be extinguished, although a cloth had been thrown over her head to protect her face, she was seriously burned, and died four or five hours afterward I think. The doctor in attendance says her death was not caused by the burns but by the shock, the burns not being severe enough of themselves to cause death. There was no explosion, no further fire, no damage to property. Kerosene was used, flash test not known; but same quality of oil had been safely used before in same tent. Mother-in-law's hands slightly burned but are now well. The above I think covers all the material facts in the case."

If the oil used in this case had not been very light and inflammable probably this life would not have been lost. It was probably such oil as would pass the test now required by law, but judging from the number of such occurrences as the above-described, the legal test is not high enough to afford very good protection to the people who use kerosene oil.

Woman Fatally Burned in Osceola Tp., Livingston County.

The "Detroit Free Press" of July 20, 1894, reported the occurrence of a fatal casualty from the use of kerosene, in Osceola township, Livingston county. The usual letter of inquiry from this Office, having been sent to the health officer of Osceola township, E. R. Merithew, that officer replied as follows:—

"I enclose a report from one on the ground."

Following is the report referred to by Mr. Merithew:—

"Thursday noon, July 19, 1894, Mrs. Allen Thayer, of Osceola, was burned to death in a shocking and horrible manner. Mrs. Thayer was preparing dinner and had just rang the dinner bell for her husband and hired man, and then returned to the house to look after the baking in a small kerosene oil stove.

"Just how the terrible accident occurred is only known by what Carrie, her eight-year-old daughter, the only witness, can remember. Upon removing the oven the stove was accidentally tipped over. In trying to save the stove from falling, her apron caught fire. This Mrs. Thayer hastily tore from her person and threw into the next room setting the window curtain and other articles on fire. The stove fell to the floor and the flames blazed over Mrs. Thayer's entire person almost instantaneously. She fell back leaving the marks of her burned body and extended arms on the floor. Her screams, and those of her daughter Carrie, and the ringing of the bell brought the men from the field, only to find the room filled with smoke and fire and Mrs. Thayer lying on the floor totally enveloped in flames.

"The hired man, Joseph Sharp, was the first to reach the house. He at once threw a blanket over the unfortunate woman, and removed her to an old house standing a few feet back of the other. Her first words were, 'save the baby, who is asleep in the burning house.' He rushed in and seized the two-year-old boy, unconscious of harm or danger. Mr. Sharp then gave his attention to extinguishing the flames in the room. Had he not used the best of judgment and put forth almost heroic efforts, the house must have been consumed. Mr. Thayer reached the scene only a minute or two after Mr. Sharp. The alarm soon spread and neighbors came flocking from all quarters. J. L. Payne drove rapidly for a physician while the women present did all in their power to relieve the excruciating sufferings of the victim of the accident. Every shred of clothing was burned from her person, and the flesh was burned to a crisp and in some places hung in tatters. Dr. Boyd, of Hartland, soon came, but could do nothing but alleviate her sufferings. Death came to her relief in about two hours and a half. Her suffering and agony were indeed great, but Mrs. Thayer remained conscious almost to the last."

Woman Severely Burned by Kerosene in Pinckney Village.

The following item, relative to Pinckney village, appeared in the "Stockbridge Sun" of Aug. 9, 1894:—

"On Monday morning, early, Mrs. Albert Reason, of this village, was frightfully burned by the explosion of a kerosene-oil can. Her fire not burning to suit her, she took the can of oil, and poured some on the wood in the stove to hasten it; and in doing so the oil took fire, which caused the can to burst in her hands, throwing the oil over her clothing and person, and immediately she was in flames. She rushed out of the door screaming, which brought Mr. Reason and Ed. Farnum to her rescue, and they succeeded in putting out the fire by tearing off her burning clothes, and throwing water on her. Mrs. Reason's hands, arms, and right thigh were badly burned, though not dangerously."

The usual letter of inquiry in such cases, was sent to Dr. H. F. Sigler, health officer of Pinckney, who replied substantially as follows:—

"There was an explosion. There was a fire, caused by kerosene. Amount of pecuniary loss $25. The oil was that sold as *water white*. The above report is correct. Mrs. Reason was badly burned about hips and both arms, but is recovering."

Woman Fatally Burned by Kerosene in Palmyra Township.

The "Detroit Journal" of Aug. 24, 1894, contained the following item:—

"Adrian, Mich., Aug. 23.—Special.—Mrs. George Southwick, aged 47, wife of a farmer living four miles southeast of this city, in Palmyra township, tipped over a lamp about 7 o'clock last evening, setting fire to her clothing, and burning her horribly before aid could be given. She lingered in terrible agony until 4 o'clock this morning."

In reply to inquiries from this Office, T. O. Turbett, health officer of Palmyra township, stated that there was no explosion, nor fire, that the casualty was caused by Kerosene, that the above newspaper report was substantially correct, and that the woman was horribly burned. He further stated that:—"The lady was a victim of epilepsy, was carrying the lamp when one of her fits came on. The lamp did not explode as it was found on the floor where she fell, it was out. After coming to, she got up and ran out of the house."

Man Fatally Burned by Kerosene in Ann Arbor.

The "Detroit Free Press" of Nov. 15, 1894, contained the following:—

"Ann Arbor, Mich., November 14.—Henry Binder, an old and respected business man of this city, was found dead in his barn between 11 and 12 o'clock last night. It appears that he went out to feed his horse and fell down the ladder leading to the hay loft. The lantern which he had with him exploded, covering him with oil, burning him to death. Mr. Binder was subject to spasms, with which he may have been seized at the time of his fall."

Dr. John Kapp, health officer of the city, when written to from this office relative to this casualty, confirmed its occurrence, and stated substantially that there was an explosion of kerosene, and that Mr. Binder was dead when found.

Child Severely Burned by Kerosene in Grand Rapids.

Notice of a casualty from the use of Kerosene which occurred in the city of Grand Rapids Nov. 16, 1894, having reached this Office, the usual letter of inquiry was sent to the health officer of the city. In reply to said letter, W. A. Wilson, Secretary of the board of health, wrote, Dec. 11, 1894:—

"The enquiries made in regard to the lamp accident in the family of Leonard Vanderjagt, gives us the following,—The child accidently struck the lamp, loosening the screw in the ceiling. The heavy iron fixtures at the top fell on the lamp, breaking it and spilling the oil, which saturated the table cloth and clothing of child. The oil became ignited by the burning wick, and the child was considerably burned. There was no explosion, and the damage—aside from the burning of the child—was about five dollars. Child is living and doing well."

Woman Fatally Burned by Kerosene in Detroit.

The "Detroit Free Press" of Aug. 14, 1894, contained a report of a casualty from the use of Kerosene, at the residence of Mrs. Gardner, 830 Jefferson Ave., Detroit, in which Mrs. Bradley was fatally burned.

In reply to enquiries from this Office, The Fire Marshal of Detroit, Wm. H. Baxter, wrote relative to this casualty, as follows:—

"Relative to the fatality at 890 (not 830) Jefferson Ave., I have to say that Mrs. Bradley was engaged in boiling clothes in an ordinary wash boiler on a kitchen stove, and undertook to pour kerosene into the boiler. Apparently as soon as the oil touched the boiling water it flashed up and the flames communicated with her clothing.

"This is the explanation made by her at the hospital just before her death, and is assumed to be correct. None of the Gardner family were up at the time of the mishap, consequently they were unable to offer any explanation. * * *

"The above information is gleaned from authoritative sources after patient inquiry."

Another Woman Fatally Burned by Kerosene in Detroit.

The "Detroit Free Press" of Nov. 17, 1894, contained the following news item:—

"Mrs. Anna Conoughton, aged 60, living at 280 Bellevue avenue, was frightfully burned by the explosion of a kerosene lamp about 5 o'clock yesterday afternoon, and the injuries will probably result in her death. She was alone in the house at the time and but for the timely arrival of several neighors would have been burned to a crisp. Mrs. Conoughton took the chimney off and applied a match when the flames shot up in her face. Suspecting that something was wrong she took the lamp up, intending to carry it out of doors, but it exploded and the unfortunate woman fell to the floor.

"The burning oil ran over her clothing and hair and in a moment every particle of her wearing apparel was a mass of flames. She was unable to assist herself, but her cries were heard by two of the neighbors who rushed to the house. They found Mrs. Conoughton lying on the floor and they quickly covered her with quilts and other articles which extinguished the flames. She was in a terrible condition, her whole body being burned, together with her face, head and arms. The remnants of her clothing were taken off and a call was sent to Harper hospital. On the arrival of the ambulance the unfortunate woman was taken to St. Mary's hospital, where she received medical attention. Last night she was still alive, but the doctors say that she cannot live. The fire department was summoned to the scene of the explosion by an alarm from box 72."

Nov. 20, 1894, the Secretary of this Board wrote to the Fire Marshal of Detroit as follows:—

"Herewith I enclose a copy of a local item quoted from the 'Detroit Free Press,' Nov. 17, 1894.

"The last part of the first paragraph relative to her [Mrs. Conoughton] taking off the chimney and applying the match, when the flame shot up into her face, followed by an explosion, I am especially desirous of knowing more about."

In reply to the Secretary's letter Mr. Baxter wrote:—

"Relative to the death of Mrs. Anna Conoughton of 280 Bellevue Ave. I have to say that she took a kerosene oil lamp out of a bracket, placed it upon a table, replenished it with oil, lighted it and started to return it to the bracket when it slipped out of her hands and fell to the floor. In her effort to recover the lamp she lost her balance and fell upon it. Probably on account of being insecurely fastened, the

burner and its attachments were forced off the glass reservoir, and the oil took fire, and the unfortunate woman was found in the position above indicated, with her clothing on fire. The reservoir of the lamp was badly smoked but was not even cracked.

"Mrs. C. was affected with rheumatism to some extent, especially in her hands, which probably accounts for the fall of the lamp."

Nov 24, 1894, the Secretary again wrote to Mr. Baxter as follows:—

"Relative to the case of Mrs. Conoughton, I believe that if a sample of the oil ware tested it would be found to be below the legal test. If such oil will stand the legal test, then the standard is probably too low because with such oil as I use it would not take fire under such circumstances.

"If practicable I shall be glad to have at least one-half pint of the oil, so that I could give it the test myself. I shall be glad to have any other information you may be able to give on this interesting case."

In reply to the last-quoted letter, Mr. Baxter wrote:—

"Owing to the fact that Mrs. Anna Conoughton was alone in the house at the time of the accident; that all the oil she had in the house was consumed, I find it impossible to obtain for you a sample for testing purposes.

"From an examination of the lamp, soon after the mishap, and from conversation with the police officer and a citizen who lifted her from the floor, and other circumstances, I feel assured that the burner had not been properly adjusted, and that when she fell it was disconnected. It is probably true that her clothing was first set on fire and that the oil was ignited after she fell."

Carelessness in the Use of Kerosene.

Although some of the casualties included in the foregoing lists and tables, were no doubt the result of carelessness, and might have occurred with the safest quality of oil; there are others, attended with circumstances which make it probable that the oil used was of a lighter grade than a safe illluminating oil should be.

In the Annual Report of the Secretary of this Board for the year 1894, attention was called to some dangerous practices in connection with the use of kerosene in 1893. The facts relative to 1894, show that casualties which caused much human suffering, and pecuniary loss, resulted from just such practices; it is therefore deemed advisable to repeat the warnings previously given, in the hope that by avoidance of such practices casualties may in future be prevented:—(1) It is dangerous to leave small children alone in a room with a lighted lamp. (2) A burning lamp is most dangerous when the wick is turned down so as to emit only a small flame, because then the top of the lamp is very much heated. (3) A burning lamp without a chimney, or with a broken chimney, is dangerous, for the reason just stated. Experiments have proved that in fifteen minutes a burning lamp without a chimney or with a broken chimney is usually in a condition involving danger of explosion. (4) It is *exceedingly* dangerous to attempt to kindle, or rekindle, a fire with kerosene.

INJURIES AND LOSS OF LIFE AND PROPERTY ALLEGED TO HAVE BEEN CAUSED BY THE USE OF GASOLINE IN MICHIGAN IN 1894.

In 1894, as in former years, an effort was made, at the office of the Secretary of the State Board of Health, to collect facts respecting every casualty attributed to the use of gasoline, in Michigan, which came to notice. During the year there were received at the office of the Secretary of the Board reports of 39 casualties in 3 different parts of the State, alleged to have been caused by gasoline, with attendant losses of life and property, and personal injury, as follows:—Two persons fatally, and five persons more or less severely burned; damage to property to the amount of $8,671.

The amount of pecuniary loss was not reported in two of the above-mentioned 39 casualties.

TABLE 1.—*Casualties in Michigan during the year 1894, believed to have been consequent on the use of Gasoline, information of which was received at the Office of the Secretary of the State Board of Health.*

	Number of Casualties.	Number of Localities.	Pecuniary losses, Dollars.	Lives lost.	Persons injured (not fatally).
In Detroit	37	1	7,071	2	4
In State (outside Detroit)	2	2	1,600	0	1
Totals in Michigan	39	3	8,671	2	5

Of the 39 reported casualties from the use of gasoline during the year 1894, 8 were attributed to stove explosions, 22 to leaking or overflowing stoves, and 9 to carelessness in handling gasoline, and various other causes.

The Source of Danger in the use of Gasoline.

The special source of danger in the use of gasoline, is its ready vaporization at low temperatures. When exposed to the air, gasoline evaporates quickly, its vapor mixes with the air, and therewith forms an explosive mixture which readily ignites when it comes in contact with a flame or other sufficient cause. This property of gasoline renders it more dangerous than is gunpowder. Some of the casualties reported, were undoubtedly the result of ignorance, or disregard, of these facts.

Below are given details relative to reported casualties, some of which show the result of ignorant or careless handling of gasoline. The correctness of the details has been confirmed by health officers or other officials of the localities where the casualties occurred:—

Woman Burned by Gasoline, in Kalamazoo.

The "Detroit Free Press" of Mar. 8, 1894, contained the following news item:—

"Kalamazoo, March 7.—(Special.)—Mrs. John Elliott was frightfully burned this morning by gasoline which had leaked from a stove."

Replying to inquiries from this Office, Dr. Adolph Hochstein, health officer of the city, confirmed the occurrence of the casualty, and relative to the personal injury to Mrs. Elliott said:—"Superficial burn on back of right hand."

Property Damaged by Gasoline, in Manistee City.

The following paragraph appeared in the "Detroit Journal" of Sept. 26, 1894:—

"Manistee, Mich., Sept. 25.—Special.—By the explosion of a gasoline lamp this morning W. R. Smith's saloon and dwelling were greatly damaged. Loss, $3,000. Insurance, $1,500."

In response to the usual letter of inquiry from this Office, Dr. D. E. Robinson, health officer of the city, stated the above paragraph was substantially correct, and that the amount of damage was about $1,600.

Woman Severely Burned by Gasoline in Detroit.

Relative to this casualty, the Fire Marshal of Detroit wrote Nov. 23, 1894:—

"On the 19th inst. a Mrs. Catherine Murphy, aged about 60, living at No. 38 Chase street, started to fill a small kerosene oil lamp. She placed it on a table alongside of another lamp which was burning, and, manifestly by mistake, got hold of a can containing, as near as can be estimated, about a quart of gasoline. Just as soon as she commenced pouring the liquid it ignited and exploded the can, blowing the bottom entirely out, and enveloping her in flames. She ran out of the rear door, to the house of a neighbor who smothered the blaze. Mrs. Murphy was very badly burned about the head, face and hands. She will recover, but, so says her physician, she will be badly scarred.

"Her loss by the fire which resulted will probably be $50.00, while the damage to the house will be about $35.00."

A Man and a Woman Burned by Gasoline in Detroit.

The following quotation is from the "Detroit Tribune" of Aug. 25, 1894:—

"A gasoline stove exploded at 556 Gratiot avenue yesterday shortly after noon and the fire department had to be called out. August Craft, living at 986 Palmer avenue, while attempting to carry the burning stove from the building, which was of wood, had his hands badly burned."

Relative to this casualty, the Fire Marshal of Detroit wrote to this Office:—

"The stove overflowed, one of the burners having gone out. There was a sudden flash. Mrs. Abram A. Jacobs, in whose apartment the stove was, attempted to put out the blaze, and was burned on one arm. Craft, hearing her screams, ran up stairs to help. He dragged the stove to a rear door with a view of throwing it out, but in the excitement tripped and fell with the stove on top of him. He was burned somewhat, but not seriously. Other help came and the stove was finally hustled out and into the back yard. Mrs. Jacobs had rooms in the second story of a tenement building."

A Child Fatally Burned by Gasoline in Dteroit.

The following local news item appeared in the "Detroit Tribune" of July 20, 1894:—

"Lena Mueller, the five-year old daughter of Rudolph Mueller, of 576 Chene street, was burned to death yesterday morning about nine o'clock. The child's clothing caught fire from a gasoline stove. The parents live on the second floor. Mrs. Mueller had gone down stairs to get some milk, leaving the stove burning. When she was on her way up stairs again she heard the little girl screaming and hastened to her side. Her clothes were burning fiercely and the flames scorched her face. She was trying to put them out with her little hands, but the task was too much for her. Mrs. Mueller grabbed a quilt from one of the beds and extinguished the blaze.

"Dr. John Kestel was summoned at once as were also two other doctors, but could do nothing to relieve the child's sufferings, and at 12:40 o'clock she died. Coroner Beatcher was called and will make an investigation and hold an inquest."

Confirming the occurrence of this casualty, Mr. Wm. H. Baxter, Fire Marshal of Detroit, wrote:—

"The child's mother having gone down stairs temporarily, the child removed a coffee pot that stood over the only burner in operation to another part of the gasoline stove to enable her to climb upon it so that she could look out of a window. The little girl stepped from a chair to the top of the stove and stood directly over the burner and her clothing took fire. The child died at 1:20 P. M."

A Woman Fatally Burned by Gasoline, in Detroit.

The "Detroit Tribune" of Dec. 29, 1894, contained the following item:—

"Mrs. Peter J. Hubbard, the wife of a blacksmith, living at 254 Fourth street, was frightfully burned about the body and face last night by the explosion of a gasoline stove. She was taken to Emergency Hospital and will probably die. * * *

"The accident happened a few minutes after 8 o'clock. Mrs. Hubbard had gone up to the second floor of the house to light a gasoline stove in the bedroom. Mr. Hubbard was down stairs at the time when he suddenly heard a scream from his wife. He dashed up the rear stairs, but was cut off from going through the hall by a solid wall of flame that shot across the hall from the bedroom where the burning stove was. In trying to get through the flames he was badly burned on the hands and about the face. Seeing that it was useless to try to get through the fire, he turned and ran down the stairs again and went to the front of the house intending to get up the front stairs.

"When he got to the front hall, a terrible sight met his eyes. His wife lay on the floor, partially wrapped in old clothes and blankets and was writhing with pain and torture. Her screams could be heard for a block and her flesh was burned to a brown almost all over the body. She had been saved from instant death by a man who rushed in the front door, when he heard her screams and seeing the woman lying at the foot of the stairs in a mass of flames, he had grabbed several coats that hung in the hall and with these he had succeeded in putting out the fire, but not before the woman's clothing was entirely burned off her.

"In the meantime some one had turned in a fire alarm from box 341 and also sent for the ambulance from Emergency Hospital. Both responded in the nick of time. The fire was quickly put out with a small damage and Mrs. Hubbard was taken in the ambulance to the hospital. Here she was swathed in oil and cotton, but there is little hope that she will recover. Her thumb on the left hand was entirely burned off and her wounds are terrible.

"It appears that she was just about to light the stove when some of the gasoline that had leaked to the floor caught fire and ignited the bottom of her dress, which was of light material. This quickly spread to the large can on the top of the stove, where the supply of gasoline is kept and in a moment the whole stove was in a blaze. As Mrs. Hubbard ran out her dress caught and tipped the stove over and this was what caused the flames to spread across the hall.

"Mr. Hubbard also came to Emergency Hospital and had the wounds on his hands and face dressed. He is not seriously burned, but it will be some time before he can work again."

The occurrence of this casualty was confirmed by the Fire Marshal of Detroit.

ALLEGED NUISANCES IN MICHIGAN IN 1894.

During the year 1894, communications relative to 42 alleged nuisances were received at the office of the State Board of Health, from forty localities in Michigan.

The causes to which the alleged nuisances mentioned in these communications were attributed, may be classified as follows:—

Dead horses, 10; unsanitary condition of school house and dwellings, 3; slaughter houses and their surroundings, 6; contaminated water, 3; cesspools, privies, etc., 4; hog-pens and barn-yards, 4; old hotel, 1; fertilizers, 2; dam in stream, 1; drains and ditches, 3; dead and refuse fish, 2; refuse from butter factory, 1; filthy premises, 1; cemeteries, 1.

Whenever complaint of an alleged nuisance is received at this Office, the president of the local board of health whose duty it is to act, is informed of the nature of the nuisance, and is requested to investigate the same. At the same time sections of law and pamphlet publications of this Board pertaining to nuisances and to the duties of local boards of health relative thereto, are sent to him, and also to the person making complaint.

The following extracts from the correspondence of this office relative to the above-mentioned 42 alleged nuisances, show the nature of those nuisances, and the action taken, and recommended to be taken, in regard to them:—

DEAD HORSES, ALLEGED NUISANCES.

Carcass of a Horse Buried near a Well in Colon Township.

Jan. 22, 1894, P. L. Hartman, M. D., health officer of Colon Tp., wrote to the Secretary of this Board as follows:—

"I write you for information in regard to a case brought before me in this village. Mr. J. W. buried the carcass of a horse in a vacant lot between two laid-out streets in this village. The lots in which he buried the carcass belong to him. He was notified by his neighbors before burying the carcass not to do it; but claimed he had a right to bury it two feet below the surface. Now it is just 105 feet from Mr. A. A.'s well to the carcass, and he enters complaint. Please inform me of the law in regard to the matter, and my duty.

"This village is not incorporated."

In reply to Dr. Hartman's letter the Secretary wrote to him Jan. 24, 1894, as follows:—

"Replying to your question of Jan. 22, relative to a dead horse,—a dead horse buried within 105 feet of a well which supplies drinking water, is undoubtedly a nuisance, which should surely be abated. The township board should declare the same to be a nuisance, and order it abated.

"Any water obtained from a well so located ought not to be used for drinking or culinary purposes until it has been boiled. You should warn Mr. A. A., so that his family may do so.

"The board of health should make and publish regulations which they may deem necessary for the public health and safety, respecting any article or thing which is liable to convey infection or create any sickness, in accordance with Section 1635 of Howell's Statutes. After these regulations have been published they have the force of law. It is absolutely known that infected material may filter through the soil, from a distance, and contaminate drinking water. I send you herewith a copy of the pamphlet on

the Work of Health Officers and of Local Boards of Health, and a copy of the pamphlet on the Prevention of Typhoid Fever, in both of which I have marked parts bearing upon the subject. After reasonable time I should be glad to know whether or not this nuisance was abated.

"I send a stamped envelope for your reply."

Feb. 2, 1894, S. K. McMillen, supervisor of Colon township, wrote as follows to the Secretary relative to this alleged nuisance:—

"In the matter of the burial of a horse by Mr. J. S. W. that was reported to you a few days ago, I understand that he refuses to remove.

"Now if in your opinion you think he should remove it, please notify him through me to that effect, as he will think that a notice from the State Board of Health will be more binding, and send it at once as we meet next Saturday to act upon the matter."

In response to Mr. McMillen's letter, Feb. 2, 1894, the Secretary wrote:

"In accordance with your request of Feb. 1, I send you herewith, addressed to Mr. J. W., a letter relative to the removal of a dead horse buried within a short distance from a well which is used for drinking and culinary purposes.

"I regard this dead horse as dangerous to the public health, and as a nuisance which should surely be abated. My own view is that the local board of health should declare the same to be a nuisance, and order it abated."

On the same date (Feb. 2, 1894), the following letter was sent from this Office to Mr. J. W., who buried the carcass of the horse:—

"It is reported to this Office that you have buried on your property a dead horse which is within about 105 feet from a well which supplies water for drinking and culinary purposes. I regard this a nuisance which is dangerous to the public health, and should be immediately abated."

In reply to the Secretary's letter Mr. W., Feb. 5, 1894, wrote as follows:—

"Your favor of the 2nd inst. in which you state that it is reported to you that I have buried a horse on my property within 150 feet from a well which supplies water for drinking and culinary purposes, and that you regard it a nuisance which is dangerous to the public health, and should be immediately abated. Now, how do you arrive at such a conclusion without knowing the nature of the soil in which the animal is buried, and without knowing the depth from the surface to the water? Now the condition of the ground is as follows: The surface being level sandy loam, about two feet deep, with more or less hard pan until we reach water, and has to be more or less dug with a pick ax; we find water at a depth of 30 feet in a bed of washed gravel. Question—Is it possible that any surface water could reach that bed of washed gravel spoken of?

"The horse was buried, and every particle of the same, between 3 and 4 ft. from the surface. It seems impossible to me that any rainfall could reach the horse through this dry soil. The general opinion held by people in this section, is, that decayed animal matter buried at the depth the horse is buried in this soil, will come up and dry up, by coming up we mean that it will come up as the vegetable kingdom requires it, instead of going down.

"Between where the horse is buried and the well spoken of and less than 50 ft. from the well there is a privy, which has been used for 15 or 20 years, and is used by from 6 to 10 persons daily. Please answer whether you would consider that a nuisance or not. Nearly all the privies in our village are within 100 feet from wells. Do you consider them nuisances in this soil? Now, Mr. Baker, I do not wish to be made a subject of prejudice. My judgment is that a privy used for a series of years by a large number of persons, to wit: 10 persons within 50 or 60 feet is a much greater nuisance than a horse would be, buried 150 feet away under 3 or 4 feet of earth.

"Please let me hear from you as early as possible.

"Please cite me the State laws that would compel me to move the horse."

In reply to Mr. W.'s letter, the Secretary wrote to that gentleman, Feb. 7, 1894, as follows:—

"Please accept thanks for your letter of Feb. 5, giving me information relative to alleged nuisance.

"Replying to your question relative to the surface water on the surface where this horse is buried, there is I believe about thirty inches, or two feet and one-half, of rainfall every year, and I should think that the soil of which you speak is just the kind which would be conducive to the surface water leaching into the water-supply. All water in wells consists of the rainfall which has settled into the wells. The water would go through this sandy loam until it reached the hard strata, then part would filter through the hard pan, and part would be deflected into some well or ravine. I should certainly think there was danger from this surface water being contaminated and reaching the water supply. Herewith I send you a pamphlet on the 'Prevention of Typhoid Fever' in which I have marked parts bearing upon this point, and which prove that contaminated water *may* reach a water supply from a much greater distance than 100 ft. Many cases are on record; one notable one at Lausanne, Switzerland.

"It would seem that the privies you mention *are* nuisances, which should be abated by the local board of health. I send you by mail a copy of the pamphlet on the work of health officers and local boards of health in which I have marked parts which will show you the duties of the local board, which are provided for by State law. If the local board refuses or neglects to make the proper complaint for the abatement of a nuisance injurious to health, any person injured or annoyed thereby may make complaint and prosecute a suit for the abatement of the nuisance as a public nuisance, or for damages by reason of the nuisance as a private nuisance, and for the abatement of the same.

"The board of health *shall* examine into all nuisances, sources of filth, etc., and causes of sickness that may, in their opinion, be injurious to the inhabitants within their township, city or village; and, whenever any such nuisance or cause of sickness, shall be found on private property, the board of health shall order the owner to remove the same within twenty-four hours; if the owner does not remove the same, he is subject to a forfeit of not exceeding one hundred dollars. If the owner does not remove the alleged nuisance ordered by the board of health, such board may cause the nuisance to be removed at the expense of the owner. By mail I send you a copy of the Public Health Laws in force in Michigan in 1890, in which I have marked parts bearing on the subject."

March 7, 1894, S. K. McMillen, supervisor of Colon township, again wrote to the Secretary as follows:—

"Would like to ask your opinion in regard to some questions of law which do not look clear to me, viz.: That in the case of something buried upon a piece of ground which has been complained of as being a nuisance and injurious to the public health, and the local board of health is called together to examine the same, and were refused admission to the premises by the owner, what course would they then pursue to investigate the matter, and would there be any way to punish the owner of the property for refusing the said board admission to the premises, and in what way would they proceed to inflict such punishment?

"I would think that the board of health would have the right granted them by law to make such investigation, and be protected by the law without using main force; but as yet find nothing touching the matter except in the case of entering buildings or vessels within the townships.

"The above is not satisfactory explanation to me of the case in question, which is that of Mr. W.'s horse to which your attention has been called. The Board declared it a nuisance and ordered it removed, which he promised to do and says he has done so but some claim that it has not been removed, and the Board went to investigate, and he refused the Board admission to the premises and went so far as to draw a club, warning them that he would hurt the one who entered the premises; and now the remedy?"

In reply to this last letter, the Secretary wrote to Mr. McMillen, Mar. 8, 1894, as follows:—

"Your letter of March 7, is before me.

"Section 1640 Howell's Statutes requires the board of health to 'examine into all nuisances,' etc., 'within their township,' etc., and the same shall 'destroy, remove, or prevent the same as the case may require.' This seems to be all the authority necessary in the case with which you have to deal—that of Mr. W—'s dead horse.

"If you require to enter any building on Mr. W—'s premises, then you should act under § 1644 Howell's Statutes. 'Any member of the board of health may make complaint, under oath, to any justice of the peace of his county, whether such justice be member of such board or not, I do not suppose you will need to act under this or the succeeding section. If the board of health acts under § 1640 Howell's Statutes I do not think that Mr. W—. or any other rational man would dare *resist the officers in the performance of their duty.* If he did I think the punishment under the law need not be long delayed.

"Referring to *the duty of your board* the law says, 'and the same *shall* destroy, remove, or prevent, as the case may require.' *The law is imperative, and I cannot see that any further authority is needed.* (A justice of the peace, and an officer to execute the orders of the justice, might accompany the board of health, with perhaps a warrant for the arrest of Mr. W—, for resisting an officer or for some other illegal act, and arrangements so made that his arrest could be immediately effected in case he did resist. But on this part of the subject I shall not presume to advise.)

"I trust the nuisance will be abated, and that you will not have further trouble in doing so."

Advice asked relative to Expense Incurred in Burying Dead Horses.

Jan. 25, 1894, John H. Sweetland, M. D., health officer of Mottville township, St. Joseph county, wrote to this Office relative to the burial of dead horses in the unincorporated village of Mottville, as follows:—

"Will you please give me some advice on the following case? Last summer while we were having *very* hot weather, a hotel barn here in town was burned and with it three horses belonging to a party from Ind. As soon as the fire was over the Ind. people left. This was Friday. The dead horses were here all day Saturday and Sunday. Complaint reached me and on investigation I found the bodies about half burned up and a *frightful* smell.

"Not thinking it best to have them buried in the village, I myself without consulting anyone told a party here in town that I as health officer would give him an order on the town for three dollars if he would take the three dead horses outside of the village and bury them. This he did, and on presenting the order at a meeting of the town board it was rejected. Now what I want to know is, did I do right or not; and can he collect the amount. The board claim the owner of the horses should have buried them. The ground I take is, that as the owners of the horses were known and as they were residents of Ind., and we had no way to reach them, that I as health officer not only had a right but was obliged to see that they were removed from the central part of the village.

"Now please let me know if I am right or not."

In reply to Dr. Sweetland's letter, the Secretary of this Board wrote Jan. 27, 1894, as follows:—

"Replying to your letter of Jan. 25, relative to your abatement of a nuisance by ordering the removal and burial of dead horses, I have to state that technically the health officer has no authority to abate a nuisance except as he obeys the orders of the local board of health. But being the chief sanitary officer of the locality, it is the duty of the health officer to endeavor to take such action as will result in the abatement of any nuisance. Under the circumstances which you relate, I would think the township board ought to allow the account.

"Herewith I send you our pamphlet containing instructions on the subject."

Is a Horse Buried in a Marsh a Nuisance?

Feb. 12, 1894, S. K. McMillen, supervisor of Colon township, St. Joseph county, wrote to this Office as follows:—

"Enclosed you will find draft of the burial of another horse, on which our board would like your opinion. The horse is buried in a marsh, was cut up and thrown into the hole and covered up; was buried some time last fall. What in your opinion, would you do in this case?

"Our board could see no chance for any substance to come from this horse to the spring, used for house use, as the water from the horse all runs to the lake; and in case it was declared a nuisance how could he remove it or what could he do with it?"

In reply to Mr. McMillen's letter, Feb. 14, 1894, the Secretary wrote:—

"Your letter of Feb. 12, relative to an alleged nuisance, is before me. I do not think it can rightfully be declared a nuisance, and that the horse had better remain where it is buried."

An Unburied Horse an Alleged Nuisance in Day Township.

April 15, 1894, a citizen of Day township, Montcalm county, wrote to this Office complaining that the carcass of a horse remained unburied in that township.

On receipt of the above-mentioned information the Secretary informed the president of the board of health of the township of the complaint made; and requested his attention to the matter. At the same time copies of sections 1640 and 7965 Howell's Statutes and pamphlet publications of this Board bearing on the subject of nuisances and the duties of local boards of health relative thereto, were sent to the president of the local board of health, and to the person who made the complaint.

Insufficiently Buried Horse an Alleged Nuisance in Blaine Tp.

May 26, 1894, a resident of Blaine township, Crawford county, complained to this Board that in said township a dead horse was insufficiently buried, and that by reason of foul odors arising therefrom, was a nuisance and a menace to the public health. By letter from this Office, the attention of the president of the local board of health was called to this alleged nuisance, and copies of sections of laws and pamphlet publications of this Board bearing on the subject of nuisances and their abatement, were sent to him and also to the complainant.

In reply to the letter from this Office, John J. Niederer, supervisor of Blaine township, wrote, May 6, 1894, as follows:—

"Your communication in regard to complaint of H. F. about a dead horse of C. F.'s is received, and in reply will say: said horse was buried last winter, and upon my request some work at said place was done this spring; but since that time dogs or foxes have been there and uncovered one foot. The body of the horse is under ground yet. There is no danger, no smell, nor any trouble to the public. I have been there and examined it myself. The complaint of Mr. F. is more personal spite than facts; but to satisfy parties in question, I have notified Mr. F. to put some more dirt on to the grave of his dead horse, and if he don't do it I will."

Unburied Dead Horse in Redding Township, an Alleged Nuisance.

July 16, 1894, K. C. Couch, health officer of Redding township, Clare county, wrote to the Secretary of this Board as follows:—

"There is one F. M., who had a horse die in our township and refuses to properly take care of the carcass. Perhaps if you would notify him he would care for it."

On receipt of Mr. Couch's letter, the Secretary wrote to him and to the president of the local board of health sending them copies of sections of laws and pamphlet publications of this Board which treat of the subject of nuisances, the proper legal procedure necessary to their abatement, and of the duties of health officers and of local boards of health relative to nuisances.

Dead Horses, Dogs, etc., Alleged Nuisances in Fremont Village.

Complaint was made to this Office July 17, 1894, by residents of Fremont village, of an alleged nuisance in that village consisting of dead horses, dogs and vault cleanings dumped on the highway, within 20 rods of village residences.

On receipt of the above-mentioned information, the Secretary of this Board wrote to the president of the board of health of the village of Fremont informing him of the nature of the complaint made and asking his attention to the subject.

Later reports stated that the nuisance had been abated.

Dead Horse Buried in Negaunee city, an Alleged Nuisance.

Sept. 14, 1894, J. H. Hudson, M. D., health officer of the city of Negaunee, wrote to the Secretary of this Board as follows:—

"I would like some information regarding disposal of dead horse. J. B.'s horse died and was buried by him back of his house, 2 feet below surface. Neighbors have complained to me and he refuses to move it to nuisance ground. Can we make him move this at his expense? There isn't any city ordinance bearing on this question."

In reply to Dr. Hudson's letter, Sept. 19, 1894, the Secretary wrote:—

"Your letter of Sept. 14, has been received. In reply thereto I would refer you, for the information you desire, to section 35 of our compiled Health Laws of Michigan, which is section 9323, Howell's Statutes, and which fully treats of the subject of the disposal of the carcasses of dead animals, etc. Sections 25, 26 and 27 of my compilation also treat of the subject. The health officer cannot by himself abate a nuisance. It requires action by the Board."

Copies of sections 1640 and 7965 Howell's Statutes, and pamphlet publications of this Board bearing on the subject of nuisances, were also sent to Dr. Hudson from this Office.

Dead Animals Buried near a Well, an Alleged Nuisance.

A resident of the village of Springport, wrote to the Secretary of this Board Nov. 16, 1894, as follows:—

"I, J. E. McG., living on the east end of Main St., of the village of Springport have a matter which I wish to call your attention to.

"Our neighbor, L. E. H. had a cow die last spring, which he buried on his lot about 5 or 6 rods from my well, in ground sloping away from well. I did not say anything about that. But on Tuesday last he shot and buried an old horse about 3 rods from said well, in ground rising from the well. Said well is nearly on the line between me and said L. E. Henderson; is a tile well with rock bottom, about 28 ft. deep. There are three families using water from said well.

"I reported it on Tuesday eve to Dr. M. S. Pasco 'health officer' and to Frank E. Powers, President of the village, and Justice of the Peace, and spoke to Powers again on Thursday evening, and to both again this evening. They did not give me a very satisfactory answer. They have done nothing so far; and say they do not know as they can do anything about it.

"The Doctor said he thought that the water might be affected by it."

On receipt of the above-quoted letter, the Secretary wrote to Frank E. Powers, president of the village and of the board of health of Springport, informing him of the complaint made by Mr. McG., asking his attention to the matter, and sending him copies of sections of laws, etc., bearing on the subject of nuisances, and the duties of local boards of health relative thereto.

Nov. 27, 1894, Mr. McG. again wrote to this Office, as follows:—

"The old horse that was buried near my well, was removed yesterday afternoon."

Dead Horse in Tittabawassee River.

Geo. T. Sproul, clerk of Buckeye township, Gladwin county, wrote to this Office Dec. 10, 1894, as follows:—

"I am informed that there is a dead horse laying in the Tittabawassee river at this place. The owner of the property is a non-resident living in Saginaw; the owner of the horse is non-resident living about two miles from here. At present neither party knows of the circumstances. Now will you kindly advise the Buckeye Township Board of Health what to do under these circumstances? The health officer at present knows nothing of it."

In reply to Mr. Sproul's letter the Secretary wrote to him Dec. 11, 1894, sending him copies of sections of laws, and publications of this Board from which he could learn the proper legal procedure necessary in the abatement of nuisances.

At the same time the Secretary wrote to the president of the board of health of Buckeye township, informing him of the contents of Mr. Sproul's letter, and sending him documents similar to those sent to Mr. Sproul.

Dec. 17, 1894, Mr. Sproul again wrote:—

"In reply to yours of 11th, relative to dead horse, I took the responsibility of having it removed immediately after the receipt of your letter; and agreed to pay $2.00 for same after the next meeting of the township board. * * * * * .

"Many thanks for your kind attention."

UNSANITARY CONDITION OF SCHOOL AND DWELLING HOUSES.

Crowded School-house in Coleman Village, an Alleged Nuisance.

The following letter dated Jan. 27, 1894, was received at this Office from O. P. Worden, Clerk of Coleman village, Midland county:—

"I wish to call your attention to the unhealthy condition of our school. To give you a history of our fight for a school site and building would be unnecessary and would take too long. We have been trying for two years to get a new school house and are further away now than ever. I don't know as any one of the health officers of this place has reported anything about our schools, fearing perhaps that they will be accused by the district of stirring up the school question again; but, as one who has small children going to school, I feel it my duty to do so.

"We have a district with about four hundred scholars, and there are three hundred attending school, divided into four rooms, and two of the rooms are only 18x24 feet in size. One room has an average of about fifty scholars. Nearly all the desks have three scholars and they have to change with other scholars to do their writing, etc. Last June when the weather began to get warm, there was hardly a day,—so one of the teachers told me, but one or more of the little ones was taken sick with headache or vomiting and had to be sent home; and I fear it will be worse this year than last.

"The reason I bring this to you is because it can't be settled by the district, as the fight all along has been on the school sites the one lacked from 8 to 10 votes of a two-thirds, and it was finally left with the township school inspectors who located the minority site and the district refused to vote to bond, and that is where it remains, and I don't see but what the State Board of Health and the Superintendent of Public Institution will have to step in to help us out. For a better understanding of the condition of the school, I refer you to Prof. Rice, of the school; also to business men of the place,—Mr. George Miller, Mr. Edwin Dawe and Mr. David Taylor, Jr."

In response to Mr. Worden's letter, Feb. 7, 1894, the Secretary wrote:—

"Please accept thanks for your letter of Jan. 27, in which you make complaint of the condition of the village school.

"I have conferred with the Deputy Superintendent of Public Instruction, and he says that the office would have no jurisdiction in the matter. It will probably rest with the local board of health to declare *the* condition of affairs a nuisance which is dangerous to the public health, and order the same abated.

In Saginaw the local board of health declared that the method of disposal of excreta in the schools was a nuisance, and ordered it abated. The case went to the circuit court and the local board of health received a favorable decision. The order was for closing the school until method of disposal was changed.

"From your description of the crowded condition, I would think that something should be done. Fifty pupils ought not to be housed in a room 18x24 ft. Three pupils should not be permitted at one desk. Children should not be kept in a room so close as that, where from time to time headache, and vomiting occur.

"Section 1640, Howell's Statutes, *requires the local board of health* to examine into all nuisances, sources of filth, and *causes of sickness* that may, in their opinion, be injurious to the health of the inhabitants, and *destroy, remove, or prevent the same as the case may require.*

"Section 7965, Howell's Statutes, gives the circuit court *equity* jurisdiction in all matters concerning nuisances where there is not a *plain, adequate and complete* remedy at law; and authorizes the court to to grant injunctions to stay or prevent nuisances. If the court is not in session, application should be made to the circuit judge.

"*If the local Board of Health refuses or neglects to make the proper complaint for the abatement of a nuisance injurious to health, any person injured or annoyed thereby may make complaint and prosecute a suit for the abatement of the nuisance as a public nuisance, or for damages by reason of the nuisance as a private nuisance, and for the abatement of the same.*

"Herewith I send you a copy of our pamphlet, 'Work of Health Officers and of Local Boards of Health in Michigan,' on pages 9 and 10 of which are paragraphs bearing on the subject of nuisances, and some other publications of this Office bearing on the same subject.

"I have asked the attention of the president of the Local Board of Health to this subject. If this Office can be of any further service to you in this case, it will give me pleasure.

"Herewith I enclose a stamped envelope, and after reasonable time I shall be glad to learn what is done to abate this alleged nuisance, and with what result.

"I presume the local board of education will obey any order reasonably made by the local board of health, for the abatement of the nuisance by lessening the pupils in the school rooms, by hiring other rooms and removing some pupils."

Feb. 7, 1894, the Secretary wrote to the President of the village of Coleman, as follows:—

"Complaint reaches this Office that an alleged nuisance exists in the village of Coleman, in the crowded condition of the village schools, where the crowded condition of the pupils endangers the health of the pupils. It is reported to this Office that fifty pupils are crowded into a room only 18 x 24 ft. It would seem to me that this is a dangerous condition of affairs, and should be immediately investigated by the local board of health. It is alleged that at many of the desks there are *three* pupils. This ought not to be permitted. It is alleged that when the weather becomes warm so that, because of the slight difference in temperature indoors and outdoors, the ventilation becomes bad, children get headache and some even vomit.

"If the facts are as alleged, it seems to me that it is the duty of the board of health to cause the abatement of them.

"Section 1640, Howell's Statutes, requires the local board of health to examine into all nuisances, source of filth, and *causes of sickness* that may, in their opinion, be injurious to the health of the inhabitants, and *destroy, remove, or prevent the same as the case may require.*

"Section 7965, Howell's Statutes, gives the circuit court *equity* jurisdiction in all matters concerning nuisances where there is not a *plain, adequate*, and *complete* remedy at law; and authorizes the court to grant injunctions to stay or prevent nuisances. If the court is not in session, application should be made to the circuit judge.

"Herewith I send you our pamphlet, 'Work of Health Officers and Local Boards of Health in Michigan,' on pages 9 and 10 of which are paragraphs bearing on the subject of nuisances, and some other pamphlet publications of this Office bearing on the same subject. Also a copy of the Public Health Laws—marked.

"I shall be glad to be informed whether or not, on examination, this alleged nuisance proves to be a nuisance, and, if it is, what measures are taken for its removal or abatement, and with what result. *For this purpose a stamped envelope is herewith enclosed.*

"I presume the board of education in you village will respect the order of your board for the abatement of the nuisance by lessening the number of pupils in the present buildings. I think the school board has power to hire extra rooms."

April 6, 1894, the clerk of the village of Coleman, wrote to this Office, as follows:—

"In reply to yours of Feb. 7th to the President of the Board of Health of this village, I will say the letter has been referred to the school board, and in reply they decided by an unanimous vote to 'take immediate action to abate the nuisance as far as the law would empower them to do.' I herewith inclose the report of the investigating committee appointed by the Common Council.

"Just what immediate action will be taken is hard to determine as the Primary Department mentioned in this report is the Town Hall, which has been rented for the past year.

"By order of the Common Council,

"O. P. WORDEN, *Village Clerk.*"

Following is the report of the investigating committee mentioned in Mr. Worden's letter:—

"To the Honorable Chairman and Members of the local board of health of the village of Coleman.

"We, the undersigned members of a committee to inquire into the sanitary conditions of our village schools pursuant to a communication from the State Board of Health, and a resolution of this honorable body, beg leave to report that we have visited the several school rooms and find them as follows, to-wit: (Grammar department). Number of pupils enrolled 60, average attendance 48, seating capacity 62, ventilation bad, fixtures fair, to keep in comfortable condition for pupils bad, size of room 28 ft. by 34 ft. (Intermediate department). Number of pupils enrolled 63, number in average attendance 47, number present 57, seating capacity 56, ventilation very bad, fixtures in fair condition, size of room 21x30. (Second primary department). Number enrolled 62, in average attendance 49, present 52, seating capacity 40, condition of fixtures fair, ventilation very bad, size of room 17½x23½ ft. (First primary department). Number of pupils enrolled 60, in average attendance 46, present 50, seating capacity 64, condition of fixtures good, ventilation not good, size of room 27x38 ft. In this Department as well as in the grammar department the rooms are better ventilated in that there are windows in opposite sides of the rooms that can be lowered at the top creating a draught that will in a measure purify the atmosphere. We also notice that in these rooms the pupils are looking much stronger and healthier than in the rooms of the intermediate and second primary departments and especially that of the intermediate, where we find 57 pupils occupying a space of 21x30 feet, or a little over one square yard of space to each pupil in an entirely unventilated room; but while this room is not so crowded in numbers as that of the second primary department, the pupils are of larger growth and necessarily need more breathing space than do those of the second primary department where we found 52 children occupying a room 17½x23½ feet or a little less than one square yard of space for each child, and your committee were informed by one of the teachers that in this room it had been no common occurrence for children to faint from the effects of poor ventilation and the over-crowded condition of the room.

"Your Committee would therefore recommend that the rooms in the old school building be ventilated by way of scuttles in the ceilings and if necessary openings be made in the roofs for the escape of foul air, and that a suitable room be procured for the use of the second primary department; and that the partition between it and the intermediate department be removed for the purpose of enlarging the room now occupied by the intermediate department.

"All of which is respectfully submitted,

"S. S. TOWER,
"JOHN FRENCH,
"HENRY LIKE, SR."

A Family Living in a Filthy Condition, an Alleged Nuisance.

A resident of Leonidas township, St. Joseph county, wrote to the Secretary of this Board, April 8, 1894, as follows:—

"In the interest of health and humanity I wish to bring a case to your honorable body.

"Am living on Section 5, Leonidas Tp. Almost across the road west (a little south) lives a person by the name of ——. He has a family, of a wife and six children ranging in age from 1 to 12 or 14 years. Their house consists of an upright and a lean-to built on the west side. In the main part he has stabled three horses and one cow; and in the lean-to they have stayed. There is a mud-hole in front of the house that furnishes water for the family and stock. They are in nearly destitute circumstances the year round. The man does scarcely any work, and drinks when he can get a cent. They have no water-closet

but drop around the house on the outside or in. As the prevailing winds are from the southwest we are afraid of sickness. He always has a lot of old horses around him and never buries them when they die, until arrested for leaving them.

"Local authorities claim they can do nothing. Is there no law for such a man? His children have never been to school; but are growing up in ignorance and vice."

In reply to the above letter the Secretary sent the writer copies of sections 1640 and 7965 Howell's Statutes and other printed matter bearing on the subject of nuisances, and the proper course to pursue to effect their abatement. The Secretary also called the writer's attention to Act No. 144, Laws of 1883, as amended by Act 108, Laws of 1885, which provides that children between the ages of eight and fourteen shall attend school at least four months in each year, and six weeks of which shall be consecutive. And that it is the duty of the district school board to see that this act is enforced.

Relative to this alleged nuisance the Secretary wrote also to the supervisor of the township of Leonidas informing him of the complaint made, sending him printed matter similar to that sent to complainant, and asking his attention to the abatement of the nuisance.

School House in Mayville Village Reported to be in an Unsanitary Condition.

Sept. 7, 1894, B. D'Arcy, M. D., a resident of Mayville village, wrote to the Secretary of this Board as follows:—

"Last year as you know, I was health officer in this village. I looked over our high-school building and found it in an extremely unsanitary condition. I notified the health board and also the school board, and again brought it up at our annual school meeting; and after considerable work we got a committee appointed to investigate the matter,—Hon. C. B. Mills, chairman; myself and Dr. Curtis are the committee. As I think I have made more investigation last year of the condition, I write you, not knowing but Mr. Mills may possibly have given you more information in regard to the matter.

"The school is heated by the Smead system. We have no water works, and the privies are in the basement. There was no drain last year from the basement at first, or if there was it was stopped up. There was urine flowing all over the basement, and many of the children became sick from the noxious gases rising into the school house. I have many patients every year amongst the pupils, with every symptom of gas poisoning, and I have had to take my own children from the school and keep them out for three months to recruit up, which was as I believe principally from unhealthy air. What I want is this, to build privies on the outside of the school house and have them properly attended to."

On receipt of Dr. D'Arcy's letter, the usual letter of information and pamphlet publications of this Board bearing on the subject of nuisances and the duties of local boards of health in their abatement, were sent to the president of the board of health of Mayville, and attention of the said board was asked to this subject.

On the same date the Secretary wrote to Dr. D'Arcy acknowledging the receipt of his letter, and sending him documents relative to nuisances, and also to the Smead system of disposal of excreta.

SLAUGHTER-HOUSES AND THEIR SURROUNDINGS, ALLEGED NUISANCES.

Slaughter-House in Corwith Township, an Alleged Nuisance.

March 13, 1894, a resident of the unincorporated village of Vanderbilt, Otsego county, wrote to this Office complaining of the general filthiness of the streets of the village; and in particular of a barn near the postoffice, which had been used as a slaughter-house during the winter. Also that there was no health officer in the township.

March 15, 1894, the Secretary of this Board informed the supervisor of the township of the complaint received, and asked his attention to the alleged nuisance.

Mar. 20, 1894, in reply to the Secretary's letter, the Supervisor, Mr. Frank Randolph, wrote:—

"Our township has not been without a health officer as has been reported to you. Selah Heath has not moved away, but he resigned and another was appointed. * * *

"I went and saw where the butcher was at work, and the way he did will not cause any sickness. There was never any butchering done except in winter.

"I intend to look after all privies, etc., and see that nothing is left to cause disease."

Slaughter-houses in Fremont Village and Dayton Township.

The following document, signed by Benjamin F. Preston and 35 other residents of Fremont village and Dayton township, Newaygo county, was received at this office:—

"To the State Board of Health, Lansing, Michigan.

"We the undersigned, residents of the village of Fremont, and the township of Dayton, county of Newaygo, Mich., do represent to your Honorable Body, that there is now maintained and in operation three slaughter houses in the township of Dayton aforesaid, just outside of the northern limits of the village of Fremont, in violation of law; they are all situated in the immediate vicinity of the public highway, neither of them being being more than three rods from it, and they are all situated near the banks of a small creek that flows through the village of Fremont. From the situation of said slaughter houses so near the highway, and creek, they are dangerous to life and health, and to all persons passing along the highway, and to the residents in their immediate vicinity they are very offensive.

"We therefore ask that your Honorable Board cause an examination to be made of said slaughter houses, with a view of abating them and force the owners and occupants to remove the same.

"Dated at Fremont, Mich., April 7th, 1894."

Notice of the receipt and nature of the above-quoted petition, copies of sections 1640 and 7965 Howell's Statutes, and pamphlet publications of this Board with marked paragraphs bearing on the subject of slaughter-houses, were sent to the supervisor and president of the board of health of Dayton township, April 17, 1894.

In reply to the Secretary's letter, Mr. Irwin C. Fox, supervisor, wrote May 12, 1894:—

"DEAR SIR:--In reply to your communication of April 17th in regard to the condition of the slaughter houses near here, will say that the township board and health officer visited them yesterday. One of them is not used now. Their condition may be improved very much by proper care and cleanliness. We have notified the parties and they have promised to attend to the matter at once. They are located near the highway and near the stream that flows through the village, and it may become necessary to remove them."

How far need a Slaughter-house be from the Highway.

C. Wunch, M. D., health officer of Saranac village, Ionia county, wrote to this Office asking, "How far need a slaughter house be from a public highway, if any one objects to it?"

In reply to Dr. Wunch's letter the Secretary wrote June 26, 1894:—

"Replying to your question (without date,) relative to a slaughter-house,—section 1682, Howell's Statutes provides that 'no person shall keep or maintain any slaughter-house, slaughter-yard or slaughter-pen, or any other place for slaughtering [butchering] or killing any animals, or rendering dead animals as a business, within twenty rods of any public highway within this State, or in any other place, except as provided in §16 of this chapter.' Persons offending shall be deemed guilty of misdemeanor and punished by a fine of not more than one hundred nor less than twenty dollars."

Slaughter-house in Hartford Tp., Van Buren Co., an Alleged Nuisance.

July 27, 1894, complaint was made to this Office by a resident of Hartford township, of an alleged nuisance, consisting of a slaughter-house one mile and a quarter south of the village of Hartford, owned by Martin I. Taylor, and that the attention of the health officer had been called to the subject, and he promised to have it cleaned up; but after waiting some time nothing had been none.

July 30, 1894, the Secretary wrote to A. P. Williams, president of the board of health of Hartford township, calling his attention to this alleged nuisance, and sending him documents treating of the subject of nuisances and their abatement.

Aug. 11, 1894, the party who complained of this nuisance, again wrote to this Office stating that on receipt of the notice from the Secretary of this Board, the local health authorities had caused the abatement of the nuisance.

Slaughter-Houses in South Lyon, an Alleged Nuisance.

July 31, 1894, L. A. Sayles, M. D., health officer of the village of South Lyon, wrote to the Secretary of this Board for advice relative to the abatement of an alleged nuisance in that village, as follows:—

"There are two slaughter houses located in the southwest part of this village which have become a stench in the nostrils of the people whenever the wind blows from the south or southwest, and those are the prevailing winds. I have compelled the owners to cleanse them twice this season; but they have become so sickening that in a few days after each cleaning they are just as bad again. The buildings seem to be impregnated with stench, and the ground about them also, seems to be so full of the stench that it seems impossible to keep them in decent condition. They are in close proximity with that portion of the town. * * *

"It seems that they would like to delay action until cold weather sets in so that they could remain where they are for another year. He told some members of the Board yesterday that they had no power to remove them, or do much about it; put his meeting off another week. Now will you advise me what to do under the circumstances? I shall await your answer anxiously.

"If the Board will not act and I have no authority to act independent of them, I can resign. If I can act I will."

In answer to Dr. Sayles' letter the Secretary wrote, August 1, 1894:—

"Your letter of July 31, relative to an alleged nuisance consisting of two slaughter houses in the southwest part of the village of South Lyon, is before me.

"By this mail I send you a copy of the Public Health Laws in force in Michigan, on pages 11 and 12 I have marked Laws relative to this subject."

Copies of sections 1640 and 7965 Howell's Statutes, and pamphlet publications of this Board containing the information asked for by Dr. Sayles, were also sent to him. And on the same date (Aug. 1) the following letter, accompanied by documents similar to those sent to Dr. Sayles, was sent to the President of the village of South Lyon:—

"Complaint reaches this Office of an alleged nuisance consisting of two slaughter houses in the southwest part of the village of South Lyon; that the buildings and the ground around them seem to be filled with the stench and that it is impossible to keep them in decent condition.

"By this mail I send you a copy of the Public Health Laws in force in Michigan, on pages 11 and 12 I have marked laws relative to this subject."

Slaughter-House in Clifford Village, an Alleged Nuisance.

Aug. 24, 1894, the health officer of the village of Clifford, Lapeer county, wrote to this Office stating that the butcher shop and slaughter-house, within 60 rods of the center of the village, constituted a nuisance, and asking what his duty was under the circumstances.

On receipt of the health officer's letter, the Secretary wrote to him (Aug. 27, 1894) informing him of the steps necessary to be taken to effect the abatement of the nuisance. On the same date the Secretary wrote also to the president of the village, informing him of the complaint made, and asking his attention to the matter.

In reply to the Secretary's letter, Mr. Wm. Spedding, president of the village, wrote to this Office as follows:—

"Yours of the 27th inst. in regard to the butcher shop and slaughter house is to hand and contents noted.

"In reply would say that I have personally examined the premises and shop and find them as clean and sweet smelling as it is possible to keep any place of the kind. I did not find bones enough around on the premises to exceed one pound in weight, and no parts of the carcass of any animal.

"In regard to the slaughter house it is about 120 rods from the center of the village and about 75 rods to the nearest dwelling. It was allowed to be built by my predecessor on his own premises about eight months ago, for a temporary convenience. I examined it and found it clean. We will give it our earliest attention and make some disposition of it."

FOUL WATER IN ST. JOSEPH CITY, AN ALLEGED NUISANCE.

June 26, 1894, complaint was made to this Office by resident property owners of St. Joseph City, substantially as follows:—

"That a manufacturing company known as C., W. & Co. (a corporation) in which large establishment knit goods, such as stockings, etc. are made. That foul water is constantly running from said factory completely covering Pine street, for several rods, from two to eight inches deep, and overflowing adjacent property, in such quantities as to endanger the health and lives of the inhabitants in the vicinity of said factory. * * * . The well water is also impregnated."

June 29, 1894, the Secretary of this Board wrote to the president of the board of health of St. Joseph, informing him of the complaint made, and asking his attention to this alleged nuisance.

In reply to the Secretary's letter, R. F. Stratton, "Chairman Health Com." wrote as follows:—

"Action on this matter was taken at the last meeting of the Council."

CESSPOOLS, PRIVIES, SEWERS, ETC., ALLEGED NUISANCES.

Sewer in Owosso City, an Alleged Nuisance.

April 6, 1894, a resident of Owosso wrote to the Secretary of this Board as follows;—

"During the fall of 1893 we had the 'Cesspool' question agitated, and if I mistake not, you were appealed to and made a visit to our town in the interest of public health and the cesspool question. Since then and during the last 3 months ditches have been dug and tile laid in them on two of our principal streets. I think I am perfectly safe in stating that not five per cent of the joints are in any manner tight or complying with the specifications. Can the State Board of Health prohibit the use of this (so-called) sewer or horizontal cesspool? * * * . What is your opinion, has the Board power and are they likely to interfere and prohibit its use?"

In reply to the above letter, April 9, the Secretary wrote:—

"Replying to your letter of April 6, relative to ditches being dug and tiles being laid in them on the principal streets,—you do not state whether these tiles are to be used for a drain or for a sewer. If for a drain it would be correct if the joints were not tight, but, if for a sewer it is important that the joints be tight.

"It is not in the power of the State Board of Health to prevent such a thing in the way you suggest,—by an order; the local board of health could act. The law requires the local board of health to examine into all nuisances, sources of filth, and causes of sickness that may, in their opinion, be injurious to the public health, and destroy, remove or prevent the same as the case may be.—§ 1640 Howell's Statutes.

"You do not state the subject explicitly enough to enable me to pass my own judgment on the merits of the case."

April 10, 1894, another letter was received at this Office from the above-mentioned complainant, stating that the contract for the construction of the sewer in question, called for carefully cemented joints; but that such joints had not been made; and that the result of this omission would be a soil saturated with sewage, and "disease prevalent."

April 11, the Secretary again wrote to the complainant, as follows:—

"Your letter of April 10, is before me. From it I learn that the city council has contracted for putting in sewers in Owosso, and that 'the specifications call for thoroughly and carefully cemented joints.' Your letter alleges that the specifications are not being complied with by the contractor. It is a subject for the local management, and I should think that if attention was called to it *publicly* in the locality, that the proper officer would see to it that the work is properly done. You might do this in your local newspaper.

"This Office has no mandatory jurisdiction, but can advise the local authorities, and that seems to be your desire. Such action will be taken by this Office immediately."

On the same date (April 11) the Secretary wrote, as follows, to the president of the board of health of the city of Owosso:—

"It is alleged that the city of Owosso has let a contract for laying tile in the street for a sewer, and that the contract calls for 'thoroughly and carefully cemented joints', and that the contract is not being fulfilled as regards the joints. It is also alleged that when the sewage is turned into this sewer that it will leak out and saturate the soil, and thus become a nuisance, endangering the public health."

With this letter to the president of the board of health of the city were sent copies of sections 1640 and 7965, Howell's Statutes, and pamphlet publications of this Board, which bear on the subject of nuisances and their abatement.

In answer to the Secretary's letter, A. L. Arnold, M. D., president of the board of health, wrote, April 13, as follows:—

"Your favor of the 11th to hand, and in reply would say that the allegations sent you concerning our system of sewerage are not correct. To begin with there was no contract given for the construction of our sewers, the work being done by the city, who paid all the men and the engineer by the day; therefore, what interest would they have in not doing the work well? I can not answer personally about *all* the joints but I certainly did see a good many made and the work, so far as I saw it, was well done. I am inclined to think your informant possibly has some personal grudge against the engineer (Jens Hartwig of Bay City) and is taking this method of getting even."

Alleged Nuisance in Fife Lake Village.

April 9, 1894, V. G., a resident of Fife Lake village, Grand Traverse county, wrote to this Board complaining that a drain leading from a hotel privy, and the drainings from two barns, drained into the lake. Also that logs were put into the lake each season, with the result that the fish were all being driven out of the lake.

In reply to Mr. G.'s letter the Secretary wrote, July 12, as follows:—

"Replying to your letter of April 9, you do not state that there is anything dangerous to the public health in connection with the complaint of the disposal of excreta and the putting of logs in the lake to which you refer. If there was I would attend to it.

"The question of driving the fish away, should perhaps be referred to the Fish Commissioner."

A Privy in Trufant, an Alleged Nuisance.

June 12, 1894, a resident of the unincorporated village of Turfant, Maple Valley township, Montcalm county, complained to the Secretary of this Board, that a neighbor's privy, situated within 20 feet of her door, was a nuisance. The usual letter and documents used in such cases, were sent; and the health officer of the township, Dr. J. G. Just, replied, substantially, that the complaint had no foundation in fact.

Privy, an Alleged Nuisance in Saginaw, E. Side.

Oct. 22, 1894, Mrs. M. E. W., a resident of Saginaw, E. Side, wrote to this Board relative to this alleged nuisance, as follows:—

"I wish to call your attention to a 'foul privy' located within about eleven feet of my dining room, and the person who put it there, did it in defiance of the law, having been forbidden to remove it. It has existed now over four months. The result is, my child is thoroughly poisoned from the dreadful stench that pervades our home.

"Our family physician, who is also health officer of this city, tells me, if the nuisance is not removed I shall be obliged to close my home and take my child away to save her life. The board of health here have served a notice upon the parties, and they paid no attention whatever. They were arrested, tried by jury twice in police court, which trials resulted in disagreement both times,—four for conviction and two for acquittal. It is to be tried again the ninth of November. The result is, I am dragged into police court, which you know is the vilest thing (in the way of law) that exists. Now I believed that a board of health was for the purpose of removing those things which are injurious to the public health or liable to become so. I fully believe in this case they are in error and are laying themselves, as well as this city liable for damages. Please suggest some way to remedy this trouble."

Oct. 23, in reply to Mrs. W.'s letter, the Secretary of this Board wrote:—

"Your letter of Oct. 22, making complaint of a foul privy which exists within 11 feet of your dining room, and alleged to be causing the sickness of your family, is received.

"I believe as you do that it is the duty of the local board of health to abate the nuisance, and not carry the subject into the police court. But there may be some reason not put before me which makes that course the proper one.

"Section 1640, Howell's Statutes, *requires the local board of health* to examine into all nuisances, sources of filth, and causes of sickness that may, in their opinion, be injurious to the health of the inhabitants, and destroy, remove, or prevent the same as the case may require.

"Section 7935, Howell's Statutes, gives the circuit court *equity* jurisdiction in all matters concerning nuisances where there is not a *plain, adequate* and *complete* remedy at law; and authorizes the court to grant injunctions to stay or prevent nuisances. If the court is not in session, application should be made to the circuit judge.

"If the Local Board of Health refuses or neglects to make the proper complaint for the abatement of a nuisance injurious to health, any person injured or annoyed thereby may make complaint and prosecute a suit for the abatement of the nuisance as a public nuisance, or for damages by reason of the nuisance as a private nuisance, and for the abatement of the same.

"Herewith I send you a copy of our pamphlet, 'Work of Health Officers and of Local Boards of Health in Michigan,' on pages 9 and 10 of which are paragraphs bearing on the subject of nuisances, and some other publications of this Office bearing on the same subject.

"I have asked the attention of the president of the local board of health to this subject. If this Office can be of any further service to you in this case, it will give me pleasure.

"Herein I enclose a stamped envelope, and after reasonable time I shall be glad to learn what is done *to* abate this alleged nuisance, and with what result."

On the same date the Secretary wrote to the president of the board of health, Saginaw, E. S., as follows:—

"Complaint reaches this Office that there is a foul privy within 11 feet of the dining room of Mrs. W., at 721 Emily street, that was put there in defiance of the law. It is asserted that the privy has been there for about four months, and that members of Mrs. W.'s family are being made sick from the dreadful stench coming therefrom, and it is claimed by Mrs. W.'s family physician that she will have to remove from her home in order to save the lives of members of her family, unless this nuisance is abated.

"It is claimed that, instead of ordering the nuisance abated, and enforcing its orders, the local board of health require the attendance of Mrs. W. at police court."

Oct. 26, 1894, H. Williams, M. D., president of the board of health, replied to the Secretary's letter as follows:—

"I received your letter in regard to Mrs. W.'s complaint. The matter is in the courts, and the local Board of Health are perfectly competent to deal with it. As you might surmise, it is a difficulty growing out of a neighborhood quarrel and according to testimony offered in the case Mrs. W. has maintained a greater nuisance on her premises than the privy in the neighbor's yard, in the shape of a sink that emptied chamber and other slops directly under her dwelling there to permeate the soil, there being no sewer connections. A desire to punish the neighbor seems to be more prominent than the one to preserve health. This however, does not influence the board. We are determined to enforce the city ordinances and punish the guilty party. Am grateful for the pamphlet enclosed."

Oct. 30, replying to Dr. William's letter, the Secretary wrote:—

"On my return from attending the Sanitary Convention at Union City, I find your letter relative to the nuisance complained of by Mrs. W. This case is of special interest to me, and, not being able to fully understand the situation, I write you again.

"Leaving neighborhood quarrels out of the question, I cannot see why the privy nuisance is not abated by your board. I have noticed in the printed proceedings of your board, that the health officer reports that certain conditions are nuisances and the board orders them abated. Now I can not see why the nuisance is not dealt with in the same manner and abated, and why the subject is taken to the courts and Mrs. W. is obliged to appear before the courts. Is it because the order of your board not being obeyed, must be enforced by a court if at all?

"I am interested in knowing just how your board proceeds to abate a nuisance, and would be greatly obliged if you will describe the method employed by your board, when the order of your board is not at once obeyed.

"Enclosed please find stamped envelope for your reply."

Oct. 31, Dr. Williams again wrote to the Secretary as follows;—

"I received your letter of inquiry concerning the complaint of Mrs. W. As soon as the board of health were notified of the existence of a nuisance near her premises, the party responsible for it was notified to remove it, and I enclose a copy of the notice in use by this board. This was served and no attention paid to it. You will notice the last clause says the board will proceed to make such changes as are required and it will be assessed against the property. We did this in some cases and the council then requested us not to do so any more, but to cause the arrest and trial of the party for violating an ordinance. The case has been tried before a jury twice, they disagreeing both times, and Mrs. W. has been called as a witness in the case. This is the way she has been called to police court. If our hands were not tied by the council requesting us not to incur the expense, the privy would have been removed and sewer connections made before now. As it is this seems the only course for us to take, and thus far we fail to get a jury who will pronounce it a nuisance and convict the guilty party for maintaining it. The case is on call for Nov. 9, and the board propose to make it a test case, and if our ordinances are defective see that they are amended. A good many others have failed to comply with a similar notice and the board wants a final decision from the courts as to their power to enforce an order of this kind. If the State Board can suggest a better course to pursue we should be pleased to hear from you."

The following is a copy of the notice mentioned by Dr. Williams:—

CUT THE RESOLUTION OUT OF PRINTED PROCEEDINGS AND PASTE IT HERE.

BOARD OF HEALTH,
CITY OF SAGINAW,
HEALTH OFFICER'S OFFICE.

To.....

You are hereby notified that the foregoing resolution declaring a nuisance to exist on the premises known as lot.....

.....

in Block.....

.....

of the City of Saginaw was adopted at a regular meeting of the Board of Health, of said city, held on..... 189...

YOU ARE HEREBY NOTIFIED, to remove or abate said nuisance, in accordance with said resolution within.....days after service upon you of this notice, and if you fail to do so, I shall prosecute you for violating an ordinance of the city, entitled "An Ordinance to establish a Board of Health and to prescribe its powers and duties" and also the ordinance of said city concerning nuisances. You incur a penalty of one hundred dollars, and are liable to imprisonment for ninety days in case you fail to comply with this notice.

You are further notified that in case you fail to abate or remove said nuisance in the manner and within the time specified in said resolution, the Board of Health will cause said work to be done, and the expense thereof to be collected from you or assessed against said premises.

Dated.....*189*... *Signed*.....

Health Officer.

Nov. 15, 1894, C. W. Light, member of the city board of health, wrote to the Secretary of this Board as follows, relative to this nuisance:—

"Do not know but that ere this you have been informed of the arrest of President Dr. Harvey Williams and myself, also Sergeant Halsey, assistant health officer, for attempting to carry out the provisions of our city charter as contained in an ordinance and also the State law.

"I think Dr. Williams has previously written you concerning the controversy in relation to a closet owned and maintained in proximity to a house occupied by a Mrs. W. Mrs. W.'s daughter, an only child, I believe, some twelve years old, has been sick all summer with malaria, sore throat and kindred troubles; two reputable physicians of this city have attended her, both giving as a possible and quite probable cause of the sickness the proximity of this foul privy, and notwithstanding the Board of Health condemned the existence of this privy as a nuisance and ordered its removal; on account of the ill feeling existing between the two women, whom I am informed entertain personal grievances against each other, the woman [another Mrs. W.] has refused to abate said nuisance, and is backed up by the advice of her attorneys, a gentleman who lives at her place, her brother, and some of the neighbors.

"Complaint was made in the police court for non-compliance with an order issued under the ordinance and in proper form. The principal time of the police court in trying both cases was taken up by the attorneys for the defense endeavoring to ring in the fact that on account of personal matters this controversy had sprung up, resulting in a disagreement of both trials, each time the jury standing four for conviction and two for acquittal. * * *

"At a meeting held recently the city attorney was not present, but sent word that he wished nothing done in relation to the W. case at our meeting, but to await its third trial in the police court. For that reason no action was taken at that meeting. A day or two after a letter was received by Dr. Williams from you in relation to a communication you had received from Mrs. W. with an abstract of the State law in regard to this matter. We did not care to take sides with either of these women but we feel that it was our duty to enforce the law, prevent contagion and preserve the public health, and in talking matters over with Dr. Williams we agreed that if under the law the nuisance could be forcibly abated it should be. We held a special meeting of the board and decided to obtain a warrant from a justice of the peace under the State law for the removal of this closet within 24 hours. This notice was duly served but went unheeded, and the doctor, myself, Sergeant Halsey, another police officer and two laborers

repaired to the scene of controversy, tipped the closet over and carried it up in the rear of Mrs. W.'s wood-shed and filled in the vault, although forbidden before proceeding by Mrs. W—d not to disturb the closet.

"A few days afterwards, the old complaint came up in the police court for a new trial. Dr. Williams and others went as witnesses only to find that the city attorney had nolle-prossed proceedings. Of course the Dr. was somewhat wrought up over this procedure, especially after what had happened, and when I learned of the matter I was also quite indignant inasmuch as nothing had been said to us in relation to this matter and after what we had done a discontinuance of the proceedings was quite liable to lead these parties to believe that we had no faith in the justice of our action.

"The following day those mentioned above were arrested for trespass and sued for $100 damage each. The arrest was not as a Board but personal. * * * * Before serving the warrant under the State law, Dr. Williams took the abstract you sent him and notified the city attorney what we wished to do and propose to do provided there was no legal objection, and he then stated that he presumed we might abate it but would not say whether to go ahead or not.

"Your abstract of the State law spoke of a deputy sheriff, constable, or other person serving the notice and our chief of police thinking the police officers had the right under the charter to serve these notices but wishing to take no chances called upon the City Attorney for advice in relation to the matter and was notified by him that it would be proper for the Assistant Health Officer who was also a police officer to serve the summons. We felt we could get no satisfaction or backing and therefore sent a communication to the council reciting our position and asking for additional and necessary counsel.

"Our communication was received and filed, and later a member of the council presented a resolution asking for the resignation of Dr. Williams, and while he claimed that he had no objection to any other member of the board, I believe there is the same objection existing to others as there is to Dr. Williams, but they dare not tackle the board as a whole fearing it would be too big a job while if they could break up the head of our board they might feel that the balance of the board would resent the insult and resign. Dr. Williams very sensibly feels that it is beneath his dignity to notice the leaders of this opposition who are composed of a few of his personal enemies, * * * and above all those sympathizers and friends of the Smead system who would like to get even with us. The city attorney practically refused, at the council meeting, to defend the members of the board of health arrested, and openly declared, before that body, that we had acted without his advice and against his will, and that being sued individually it was not his duty to defend us. He also argued that we had exceeded our authority, etc.

"You have the facts at some length. I have thought best to write you quite fully in relation to this matter and to ask your careful consideration and advice as you must have had more or less experience under similar circumstances, know quite fully the action to be taken, and I would ask you to look up the special sections of the law bearing on this case and if possible communicate with myself or President Williams at an early date.

"You will understand that our board was organized under a special provision of the charter passed at the last legislature. From the start to the present time, we have met with opposition from the Board of Education down to city officials; none of us receive a cent of pay, to say the least it is a thankless task and one of the most unpleasant boards to be on in any section, and I doubt whether any of us would have accepted the reappointment this year had it not been for the fact that the Smead people and their sympathizers here, with whom we had serious differences last season were moving heaven and earth to obtain changes, and had openly boasted that the next board of health would be a Smead board, this together with the fact that the new mayor, a strong democrat, had reappointed our board which was Republican we considered it somewhat as a recognition of services honestly and faithfully rendered by us and for these two reasons we accepted.

"Dr. Williams is a man of extended experience, sound judgment and eminent fairness. He has conducted himself with dignity upon the board, and has stood for what was right and fair with no preferences; all have been treated alike and we have endeavored to enforce the law and the ordinances without fear or favor, and so long as we remain members we propose to continue on that same line, and we propose to remain members so long as the mayor who appoints us or the better element of the council or the citizens do not request our resignation.

"Dr. Williams' case comes before the justice tomorrow; myself and Mr. Halsey's the 20th. Unlike the Celestials we are not panic stricken but are holding our ground and propose to yield only when we are fairly beaten and the courts decide, even though we may have to personally foot the bills. If I may be allowed to say it I am only saying what members of the present and previous councils have said many a time, that until the present Board of Health came into existence the enforcement of the health laws had always been a dead letter. This perhaps was not the fault of the previous Boards of Health but largely

the fact that prior to our existence and the amendment which controls our existence, the common council as a body constituted the Board of Health, and it was too large to be effective.

"Any suggestions or pointers you can give us will be duly appreciated. If you, as Secretary of the State Board of Health, or the Board itself could investigate the circumstances and be convinced that we acted in good faith and according to law and could so declare, it would be of material assistance and a black eye to our lawless element; presume however such a thing is suggesting an impossibility to you.

"I mail you papers bearing on this subject and will endeavor to send you other articles as they appear."

Nov. 16, the Secretary replied to Mr. Light's letter as follows:—

"Please accept cordial thanks for your letter of Nov. 15, giving me information relative to the abatement of the nuisance near the premises of Mrs. W., and for the information that you and other members of your board have been prosecuted for having abated that nuisance.

"I understand that the action by your board was prompted in part by the fact that the nuisance complained of by Mrs. W. *was a nuisance in fact*, and one which your local board was authorized by law to abate. I was glad to be informed that your board had abated it, and I very sincerely trust that no member of your board will be successfully prosecuted for having performed that duty under the law.

"If this Office can be of any service to you or any member of your board in connection with this nuisance or any other one, it will give me pleasure."

Nov. 17, Mr. Light again wrote to the Secretary:—

"Replying to your favor of the 16th would say, that after we had removed this closet and abated the nuisance, Mrs. W—d had the same replaced under cover of night. Since it was replaced we had a photograph taken, which we expect to use in our defense. Had a few copies at the council meeting which were spirited away by the opposition; we are to have some more finished up and will send you one for inspection.

"Our action was prompted principally by the correspondence you had with Dr. Williams, taken in connection with the marked copy of abstract of State laws sent. While we felt the nuisance should be abated, yet the City Attorney had advised taking no action until the matter was settled one way or the other in the police court, and in deference to his request we had taken no farther action, rather waiting to see what the outcome in the police court would be. When however your letter was received and the printed abstract carefully examined and then we considered the defiant attitude of the defendant, the talk it was making, besides a threatened suit against the city by Mrs. W. for damages, added to this also the fact that we believe that the City Attorney was not strictly in favor of enforcing this section of the ordinance, we decided to go ahead and abate it but not destroy the building but simply remove it, and while perhaps it will be a question of law as to whether we did overstep our authority the fact remains that we acted in good faith and with the best of intentions. The old Smead element in this city is actively at war to down the Board of Health; this disagreement between the council and ourselves has given them a fresh start.

"Dr. Williams will not resign but will stand firm, and the rest of us will back him. Dr. Williams' examination came up yesterday and was adjourned until the 27th. The City Attorney appeared for him and adjourned the case. Whether or not he will prosecute the same to the best of his ability is a question, in fact it will make but little difference so far as the Justice Court is concerned; but if the matter reaches the Circuit Court, of course it will then be necessary to watch and combat every point. The chances are that either side will carry it as far as the Circuit, possibly the defense if beaten that far might discontinue or else be carried to the Supreme Court if it seems reasonably certain that we were right.

"This case only forcibly strengthens my conviction that the State Board of Health should have a regular attorney who being posted on the State law and their interest could give them necessary advice in matters of this kind. The State and Local Boards of Health have an unpleasant and thankless task to perform. They always meet with opposition, much of which is very unreasonable. Most every one when notified to comply with the law feels aggrieved and begins to think that some neighbor has complained of him and if he has a personal difference with a neighbor he begins to oppose the action of the health authorities; ofttimes advice is asked of an attorney who sees a good chance for a fee and whose advice is such as to lead into rather than out of trouble. It is sometimes amusing to see two lawyers of average good sense read over a section of law and take opposite sides when one could almost guarantee if they were both asked their opinion by the one or the other side they would agree.

"I know of no special service at present to ask of you except that possibly your experience in these matters would lead you to pick out certain printed abstracts that would be of use to us. If you have printed abstracts of the health laws bearing on this point in question I should personally be pleased to receive copies.

"I will endeavor to keep you posted in relation to future phases of this matter."

Following is the Secretary's reply (written Nov. 20) to Mr. Light's second letter:—

"Accept thanks for your letter of Nov. 17, relative to the contention between the council and the board of health, etc.

"In accordance with your request I have sent you (yesterday) by mail and will send you some more of the publications of this Office, by mail today, all bearing upon the subject of the abatement of nuisances, giving the law governing the action of the local board of health.

"I sincerely hope that your board wins, and that your trouble will soon be settled. If I can be of any more service to you, or to any other member of your board, it will give me pleasure."

Dr. H. Williams writing to the Secretary, Feb. 22, 1895, says:—

"The nuisance case that the board were having some trouble with some time since reached the Circuit Court finally, and the board were sustained in every particular."

HOG-PEN AND BARN-YARDS, ALLEGED NUISANCES.

Barn-yard and Hog-pen in Bronson Village, an Alleged Nuisance.

April 20, 1894, S. M. Cornell, M. D., health officer of Bronson village, Branch county, wrote to the Secretary of this Board as follows:—

"Complaint has been made to me concerning a barn-yard in our village where two cows are kept as well as a hog-pen containing all the time, winter and summer, from one to three hogs, the manure from said pen and barn in connection being thrown into said barn-yard.

"Complaints have been made from time to time and health officer has made the owner look after it; but he only cleans up, and still persists in keeping the hogs under these people's noses. Now they come to me and want me to see that it is removed. * * * * *

"Now please write me and tell me what to do in order to put them in the way to not keep the hogs where they do, etc."

April 21, 1894, in reply to Dr. Cornell's letter, the Secretary wrote:—

"Replying to your letter of April 20, relative to the filthy condition of a barn-yard in the village,—in accordance with section 1636 of Howell's Statutes, the local board of health of the village should *make* regulations which should cover all such local conditions as you suggest, and in accordance with section 1639 of Howell's Statutes should *publish* such regulations in a newspaper, or if there is no newspaper within the village, then by posting them up in five places in the village, and then see that *the regulations are enforced.*

"I send you herewith a copy of the pamphlet on the 'Work of Health Officers and Local Boards of Health,' in which I have marked parts of laws bearing on the subject."

Hog and Cow Yards, Alleged Nuisance in Caro Village.

June 25, 1894, a resident of Caro village, Tuscola county, wrote a letter to the Secretary of this Board complaining that at three hotels in that village hogs and cows were kept in yards near to residences; and that said yards were nuisances by reason of the stench that arose from them.

Acting on the information received, the president of the village board of health was written to from this Office informing him of the nature of the complaint made, and asking his attention to the matter.

Copies of sections 1640 and 7965 Howell's Statutes and pamphlet publications of this Board bearing on the subject of nuisances and their abatement, were sent to the president.

Hog Pen in Richmond Village, an Alleged Nuisance.

July 7, 1894, complaint reached this Office of an alleged nuisance in the village of Richmond, Macomb county. Said alleged nuisance consisted of offensive odors arising from hogs kept in connection with a creamery.

July 7, the Secretary of this Board wrote to the president of the board of health of the village, informing him of the complaint made, and stating that if conditions existed as represented, they needed his prompt attention.

In reply to the Secretary's letter, E. B. Keeler, M. D., health officer of the village, wrote July 11, 1894, substantially as follows:—

"In answer to your letter of July 7, 1894, to the president of the village of Richmond regarding an alleged nuisance on the premises of G. and P., proprietors of a creamery in our village,—previous to the receipt of your letter I had just visited the premises on account of complaint made by neighbors to me. After your letter was received, the Board of Health (entire) made a visit to the place. We found the following conditions present: G. & P. do a large creamery business in this section. Their building for making butter is on the west side of our main street, in the outskirts of the village, and stands in a hollow close to the road. Just back of their place a stream runs which is usually nearly dry in the summer. Up the bank of the stream and over the top of a slight elevation and in a second and slighter depression stands a long low shed used for a hog pen. The buttermilk, etc., from the creamery is carried to this place in a long iron pipe, and is stored in large tanks until used. This building stands within the neighborhood of 40 rods from the highway.

"Directly across the road from the creamery is situated the residence of Mr. G., one of the members of the firm. About 100 hogs, old and young, are kept in the pen which is divided by an alley-way through the center, and on each side into small pens each opening into larger or smaller yards outside. The pens are cleaned out twice a week and the drainage from the pens is frequently scraped from the outside gutter and put in large barrels and mixed with dry earth and sprinkled with lime. Lime is also sprinkled about the place in moist spots, and when we were present the premises were in a much cleaner condition than are the hog pens of the farmers throughout the country. The proprietors admitted that at one time this summer, on account of the extra business, the pen had been neglected for two or three days, but they had redoubled their vigilance thereafter. We recommended that they should clean the place three times each week if necessary, and also use the lime more freely. When the wind blows toward the east what smell there is, is carried toward the creamery and residence of the proprietor as well as three or four neighbors adjoining his house. His family declare they have no trouble from the smell and do not wish to keep anything about the premises to annoy their neighbors. The creamery building is the most exposed one in the neighborhood and does not seem to suffer materially from any bad odor, as the butter produced commands a high price in the market on account of its superior quality. The yards about the place in which the hogs run have been newly ploughed up and one of them is devoted to the raising of crops.

"We will again visit the place in a day or two and ascertain if anything further is required.

"A report was made to the council last evening of the above facts and they directed me to report same to you which I have done at length."

AN ALLEGED NUISANCE IN PARMA VILLAGE.

April 30, 1894, the following notice was sent to this office by a resident of the village of Parma:—

"It is reported that one E. T. and family are living in an old house that used to be a hotel in Parma village, and it is said they empty all slops near the well and keep a stinking mud-hole there all the time, and several neighbors go there for water. It is said also that the cellar is in a terrible condition, being a sort of basement the timbers and floor are rotting, it being damp and they say it smells very bad. * *

"Something will have to be done before hot weather comes or there will be trouble."

May 2, 1894, notification of the receipt of the above-quoted report was, as usual, sent from this Office to the president of the board of health of the village, who replied, May 8, as follows:—

"I have examined the premises occupied by E. T. and find the worst condition prevails about the well. He has been in the habit of giving his horses water at the well and there was a small puddle where they were in the habit of standing while drinking. He promised to fill it up with fresh gravel and to keep the children from playing in the water about the well. Otherwise the premises are not in a bad condition."

SHOULD "NIGHT-SOIL" BE USED AS FERTILIZER ON MARKET GARDENS?

One of the most important questions which came to the office of the Secretary of the State Board of Health during the year, was the following.

Geo. G. Barnett, M. D., health officer of Ishpeming city, wrote to the Secretary of this Board, May 14, 1894, as follows:—

"Is it the correct and proper thing, to allow the contents of ordinary privy-vaults to be used as fertilizer in market gardens to improve the flavor and appearance of the celery, radishes, lettuce, peas and beans which we eat daily? Several of our people are just going into the business, and the question has been raised as to whether they be allowed to use 'night-soil' the same as ordinary barn-yard manure. Please give us your advice."

May 16, the Secretary sent the following reply to Dr. Barnett's letter:—

"Replying to your letter of May 14, my personal view is night-soil should *not* be used for fertilizer for the growth of cabbage, radishes, lettuce and celery.* I should think it might be very dangerous and be the means perhaps of unnecessary sickness. It is now believed that the consumption bacilli can remain in the ground in an active condition for considerable time, and it is quite possible that the typhoid bacillus may be harmful some time after it has been placed in or on the soil."

"*Night-soil*," *Garbage, etc., an Alleged Nuisance in Colon township.*

May 22, 1894, O. C. S., a resident of Colon township, St. Joseph county, notified this Office that night-soil, garbage, etc., dumped in a field, 25 or 30 rods from occupied residences, emitted odors which were very offensive and a menace to public health.

May 23, the Secretary informed the president of the board of health of the township, of the alleged nuisance, and asked his attention to the subject; adding that "When this filth becomes dry the particles will be carried in the air and distributed about the neighborhood, and may be the cause of considerable sickness. Typhoid fever may be communicated in just this way. I should think that it is very important that your local board of health take immediate action, and order this nuisance abated.

"If the garbage is to remain where it is, it seems to me that it should at least be covered with earth."

May 28, Dr. Sides, health officer of the township, wrote that the nuisance had been abated.

*"All these are frequently eaten raw. The same is true of strawberries. And the dust from night-soil is not a safe addition to other berries."

DAM IN CLARE CITY, AN ALLEGED NUISANCE.

May 14, 1894, a resident of Clare City wrote to the Secretary of this Board substantially as follows:—

"We appeal to you for assistance. A few years ago the City Council gave consent to place a dam across the stream running through a portion of the town, making stagnant water and spoiling all the low lots, as they are unfit to be tilled; too wet.

"There is the filth from one hotel, two saloons, two livery barns, one tannery besides several outhouses. The dam was placed there for the benefit of the water works, and when the well is low they throw this filthy water through the pipes supplying hotels and dwelling houses with water for domestic use. We have done all we could to get the board of health to see to it, and so thought best to write to you. Please to help us."

On receipt of the above-quoted letter the Secretary wrote to the Mayor of the city informing him of the complaint made, asking his attention to the subject, and stating that in the opinion of the Secretary the condition of affairs as described was "extremely bad, and probably dangerous to the public health."

DRAINS AND DITCHES ALLEGED NUISANCES.

Drain in Woodstock Township, Lenawee County, an Alleged Nuisance.

J. W. McGee, clerk of Woodstock township, Lenawee county, wrote as follows to the Secretary of this Board, May 14, 1894, relative to an alleged nuisance in that township:—

"The president of our township board of health, W. J. Neeley, requested me to write you in regard to a nuisance here and get your advice in regard to the matter. Mr. W. has a drain running through lands of a Mr. A. It is a town drain. Mr. A. claims that it is not a legal drain. Mr. W.'s lands are overflowed as the drain is dammed up by Mr. A.

"The township board of health met May 10, 1894. Dr. Wm. Hyndman pronounced the stagnant water to be a nuisance in his opinion and injurious to public health. The board authorized, by a motion which prevailed, the township clerk to notify Mr. A. to take out the drain or suffer the penalty of the law. To take it out immediately or within the time prescribed by law. Mr. A. has not taken it out yet. Now if Mr. A. does not take the dam out within a few days, what shall we, as a board, do in regard to the matter? Turn it over to the Prosecuting Attorney, or what? It seems Mr. A. built the dam through personal spite."

May 16, 1894, the Secretary sent the following reply to Mr. McGee's letter:—

"Replying to your letter of May 14, relative to an alleged nuisance dangerous to the public health, where the town drain is dammed up, causing an overflow of low lands and stagnant water,—I send you herewith a pamphlet 'Work of Health Officers and of Local Boards of Health', in which I have marked the law bearing upon the subject of nuisances. I think in this case you had better consult the prosecuting attorney. I should be glad to know the outcome of this case, and I enclose a stamped envelope for your reply."

Railroad Ditch in Winsor Township, an Alleged Nuisance.

The following letter dated July 3, 1894, was received by the Secretary of this Board from Albert Kleinschmidt, clerk of Winsor township, Huron county:—

"We, the Board of Health of the township of Winsor, would like to have your advice on the following case:—

"The S. F. & H. Ry. Co. have a ditch along their track through the village of Pigeon. A petition was given to our health officer (Otto Frensel) complaining about this stagnant water in said R. R. ditch. The board of health examined the case and declared the stagnant water in said ditch a nuisance and injurious to the public health. Then we gave the Railroad Co. proper notice to remove said nuisance, but they never answered our letter. We then gave the case to our prosecuting attorney. He told us it was none of his business but would write a letter to the Ry. Co. and see what they would reply. Now enclosed find their answer to the letter of prosecuting attorney. Now the people are all still complaining as the water smells very bad, and keep bothering us to do something. Please to give us all the information you can as the Ry. Co. will fight it very bad. We want to be sure to take the proper legal steps to make them come to time if we can."

Following is a copy of the letter referred to in the above-quoted letter:—

"I received your letter of June 14th. The Board of Health of Winsor are making their complaints without any reason. The only offense from that ditch is because they throw their slops into it, and make the stench themselves. There is no hole in the ditch, and there is no place where the water is stagnant, unless it is where they have stopped it up in building their roads without authority across the railroad. If they will take the trouble to correct their own mistakes, and stop making a nuisance of it by putting foreign substances into the ditch, they will have no further trouble. I have given the matter attention, and examined into the situation personally on the ground, and know that they have no cause of complaint against the railroad company."

July 5, the Secretary sent Mr. Kleinschmidt copies of sections of Howell's Statutes and publications of this Board which contained the information asked for.

Railroad Ditch in Fraser Township, Bay County, an Alleged Nuisance.

Dec. 16, 1894, Frank E. Novess, supervisor of Fraser township, Bay county, wrote to this Board as follows:—

"I wish to call your attention to a certain source of filth at Linwood in this township which is a ditch on the west side of the R. R. in said village, which has become filled up with all manner of filth and is filled spring and fall with water which has a very bad odor. Our board of health notified them last year to remove the same by cleaning out or filling up, and as they took no notice of it except to send the division superintendant who agreed to attend to it but failed to do so, our board again notified the company this fall, about two months ago. They again sent the same superintendent who agreed again to remove the same but as they have failed to do so I wish you would cause an investigation to be made with a view to removing the same."

In reply to Mr. Novess' letter the Secretary wrote Dec. 10, 1894, calling his attention to sections 1640 and 7965, Howell's Statutes, and pamphlet publications of this Board bearing on the subject of nuisances, copies of all of which were sent to him.

DEAD FISH IN GRAND AND MAPLE RIVERS.

May 16, 1894, H. Hitchcock, a resident of Lyons village, Ionia county, wrote as follows to the Secretary of this Board:—

"I would call your attention to the fact that Grand river and Maple river and the smaller tributaries in this vicinity are being contaminated by 'dead fish.' It was first noticed about one week ago, by the appearance of sick fish along the banks and many dead ones. The variety affected are principally suckers.

"The matter was brought to the attention of our village board of health and they immediately ordered the dead fish gathered and buried. And it is reported that over five bushels were found in the mill race in a distance of 40 rods, and large quantities are now accumulating along the river banks. Is this condition local or general? If general, should sanitary measures be taken to guard against the evil effects arising therefrom? Also an investigation as to the causes which produce this epidemic?

"You will please to give this matter your attention, and take such action if any as may be deemed advisable."

May 18, 1894, Mr. Hitchcock again wrote to the Secretary as follows:—

"Since writing you I learn by Portland papers that the same condition in regard to dead fish exists at that place, so much so that the authorities of the village have prohibited the sale of fish taken from the river in their market, and that the fish in the Looking Glass river which forms a junction with the Grand at that place are similarly affected. Now if this condition exists to any great extent on these and other streams tributary to them, the danger to pubic health must be very great.

"The men employed to gather dead fish at this point report that in a distance less than two miles they estimate from 75 to 100 bushels are strewn along the shores of the river. They accumulate in the eddies, bayous, and among the willows along the banks, and in some places the stench is almost unendurable.

"I think the recent rains and consequent high stage of water may have the effect to purify the water.

"My opinion of the cause of the difficulty is the recent hot weather acting on the filth which is washed into the river by spring rains has caused a rapid decomposition of the same and the sediment which would naturally follow has been taken in by the suckers.

"I submit these facts to your consideration. And if the same conditions exist to any great extent, should each locality affected be required to abate the nuisance within its own jurisdiction?"

May 17, the Secretary replied to Mr. Hitchcock's first letter as follows:—

"Accept thanks for your letter of May 16, relative to dead fish in the Grand River, Maple River, and smaller tributaries. This is the first information I have received, and I think the local board of health has taken the right steps."

In reply to Mr. Hitchcock's second letter, the Secretary wrote:—

"Please accept thanks for your interesting letter relative to dead suckers.

"Section 1640 Howell's Statutes requires every local board of health to examine into *all* alleged nuisances, sources of filth and causes of sickness that may, in their opinion be injurious to the health of the inhabitants, and destroy, remove, or prevant the same as the case may require.

"I send you herewith a copy of the pamphlet, 'Work of Health Officers and Local Boards of Health,' in which I have marked parts bearing upon the subject of nuisances."

INSUFFICIENTLY BURIED FISH REFUSE, AN ALLEGED NUISANCE.

Two letters, dated Oct. 21, and Nov. 6, 1894, written by Mrs. M. L. Q., a resident of the village of Petoskey, relative to the disposal of refuse fish in that village, were referred to the Secretary of this Board. In said letters statement was made that one Mr. C., 'who has a large fishing business' buries the refuse from his fish-house within the village limits, not far distant from residences, and that said refuse being insufficiently buried emits odors which are very offensive. It is believed by informant that the pollution of the soil by this decomposing refuse is productive of typhoid fever and is consequently a menace to the public health, and abatement of the nuisance is requested.

The action taken by the Secretary relative to this alleged nuisance was as follows:—

Oct. 25, 1894, the Secretary wrote to the president of the village that such statement had been received, and called his attention to sections 1640 and 7965 Howell's Statutes, and enclosed copies of pamphlet publications of this board bearing upon the subject of nuisances.

Nov. 6 the Secretary wrote to Mrs. Q., the informant, thanking her for her letter, quoting sections 1640 and 7965 Howell's Statutes, and also enclosing pamphlets bearing upon the subject of nuisances.

SLOPS FROM BUTTER FACTORY, AN ALLEGED NUISANCE.

The following letter dated June 7, 1894, from W. L., a resident of the unincorporated village of Pompei, Gratiot county, and addressed to this Board, was received at this Office:—

"I write you for information in relation to what is the best course to pursue to abate a nuisance, which you will see is dangerous to public health. A butter factory has been established in this community, and the slops therefrom are run into the highway ditch and are conducted about one hundred rods beside the highway. The stench arising therefrom is very bad, at times, especially in warm weather. Our local authorities appear to be at sea as to what course to pursue. The factory is located on the township line road, the building being in one town and the slops therefrom are conducted by tile into the ditch on the other side of the highway.

"Be so good as to direct the best course to pursue in the case above mentioned."

In reply to Mr. L.'s letter the Secretary sent him copies of sections 1640 and 7965, Howell's Statutes, and pamphlet publications of this Board, which contained the information asked for.

ACCUMULATED FILTH IN SENEY TOWNSHIP, AN ALLEGED NUISANCE.

F. P. Bohn, M. D., health officer of Seney Township, Schoolcraft county, wrote to the Secretary of this Board July 12, 1894, as follows:—

"I want to ask some advice in regard to the proper procedure to take to have our town or village cleaned of the filth that has been accumulating for years. We are not incorporated. I gave public notice in the spring for all premises to be cleaned up within ten days. In most cases it was entirely disregarded. I have been told that I could not go ahead and have it done and charged to the property owners, some of them refused to clean up when given verbal notice. I as health officer consider that such accumulation of rubbish is detrimental to the public health in general and should be removed, but how am I to accomplish it? I have asked the township board to let me go ahead and have it done and pay the same out of the contingent fund; but some of them object to that. Would such a procedure on my part be legal, or am I to sit here with my hands tied and do nothing at all? Please to tell me what I can do under the circumstances."

July 16, 1894, the Secretary sent the following reply to Dr. Bohn's letter:—

"Replying to your letter of July 12, relative to the filthy condition of Seney being a nuisance,—I know of no legal provision by which you can as health officer proceed to clean Seney, without the action of the local board. * * *

"If the local board of health refuses or neglects to make the proper complaint for the abatement of a nuisance injurious to health, any person injured or annoyed thereby may make complaint and prosecute a suit for the abatement of the nuisance as a public nuisance, or for damages by reason of the nuisance as a private nuisance, and for the abatement of the same."

CEMETERIES IN HAMTRAMCK TOWNSHIP, AN ALLEGED NUISANCE.

Aug. 23, 1894, C. R. Dimick clerk of the board of health of Hamtramck township Wayne county, wrote to the Secretary of this Board as follows relative to the cemeteries in that township:—

'We have four cemeteries in this township, two of which are very large. The only one with which we have any trouble is the Polish or 'Kolisinski.' It is situated upon a low piece of ground, that is impos-

sible to drain to the depth we require for burying, which is not less than five feet. In the spring and fall water is struck at two and one-half or three feet. The only attempt made at draining is into a cistern, the contents of which are pumped into the ditch on the road side with no chance to run off. All of the wells in the vicinity are supplied by surface water. The average depth of the graves in the cemetery will not exceed 2½ feet, and a large number are not over eight inches. In some cases the box is nearly level with the surface, and covered only with the dirt taken from the hole.

"We commenced suit in the court last May, and an injunction was granted restraining Kolisinski from burying; but afterwards modified, allowing graves six feet deep. Since then there have been 36 small and 7 large graves not one of which will exceed three feet.

"The rules of our board of health, of which I send you a copy, seem to cover the whole grounds. We have added to these a regulation allowing the remains of no person to be interred in the different cemeteries in the township without a permit from the Clerk of the Board of Health, to be granted upon physician's certificate of cause of death. We will also adopt the regulation you advise in your circular in regard to persons or substances. If you can advise us in this matter kindly do so and we will be very thankful."

In reply to Mr. Dimick's letter, the Secretary wrote, Aug. 28, 1894, as follows:—

"Your letter of Aug. 28, relative to rules and regulations of your board of health, and relative to cemeteries, is before me.

"The injunction of the court having been disobeyed by those who have made the burials in Kolisinski's cemetery, I should suppose your board would consult with the prosecuting attorney, and ask him to proceed with legal measures to enforce the injunction.

"§ 1636 Howell's Statutes provides that if any person, shall violate any regulation made by the local board of health he shall forfeit a sum not exceeding one hundred dollars.

"§ 8439 Howell's Statutes requires the supervisor 'forthwith to commence and prosecute a suit whenever he shall have good reason to believe that any penalty or forfeiture has been incurred within his township, which shall be recoverable before a justice of the peace.'

"§ 8440 requires every other township officer, who shall know or have good reason to believe that any penalty or forfeiture has been incurred within his township, 'forthwith to give notice thereof to the supervisor.' I would advise you to give formal written notice to the supervisor of the forfeiture by those persons who have made burials contrary to the regulations of your board.

"§ 8442 Howell's Statutes requires the prosecuting attorney to prosecute for any forfeiture within his county.

"Having made and published regulations, I think your board of health should see to it that they are enforced. * * *

"By this mail I send you a copy of the 'Public Health laws' and a pamphlet in which I have marked paragraphs relative to this subject."

Sept. 13, 1894, Mr. Dimick again wrote to the Secretary as follows:—

"There is a question of the legality of the township board of health adopting the resolution, a copy of which is enclosed.

"Howell's Statutes 1635 and 1638 apply only to nuisances and articles capable of conveying infection. Sec. 1637 it is claimed relates only to cemeteries owned by the township. That the body of a person dying of a contagious disease cannot be brought into the township without a permit is granted. But how are we to know anything about the cause of death, if we do not issue the permit in the manner prescribed by this rule? There is no penalty mentioned, or method of proceeding for violation of any rule made under this Sec. 1637, therefore Secs. 8433 and 8440 do not apply, and Prosecuting Attorney will not take the case.

"We are at present in a bad fix. We may make a rule but cannot enforce it. The two large cemeteries contain nearly 400 acres of land. Most of the burials are from Detroit, and consist of county paupers. The three small ones contain about 15 acres, and are the worst to get along with.

"If you can give me any information as to procedure in regard to enclosed rule I will be very thankful."

Sept. 15, the Secretary replied as follows to Mr. Dimick's second letter:—

"Replying to your letter of Sept. 13, Howell's Statutes, § 1635 and § 1638 apply not only to nuisances but to all 'Causes of sickness' and all 'Articles which are capable of containing or conveying any infec-

tion', which certainly includes dead bodies. You say, 'Sec. 1637, it is claimed, related only to cemeteries owned by the township', but that is a false claim. There is no such limitation in the sections. I know of no way so effective to prevent bodies dead of contagious diseases being brought into your township as the requiring of permits for all burials.

"The slip pasted in your letter seems to be rule 9 'Made and published' by your board. It does not seem to be well worded, and there is not enough before me to enable me to see just what your board has done, but I think you are wrong when you say 'There is no penalty mentioned, or method of proceeding for violation of any rule made under this sec. 1637.' The penalty is clearly stated in the law—§ 1636. Therefore secs. 8439 and 8440 *do* certainly apply; and the supervisor and the prosecuting attorney should act promptly as the law directs. In my opinion the law is plain.

"By this mail I send you marked copies of the law, and comments thereon."

Following is copy of Rule 9, referred to in the Secretary's letter:—

"That the remains of all persons brought into the Township for burial in any of the Cemeteries situated therein shall have a permit from the Township Board of Health before burial. The said permit will be issued by the Clerk of the Board of Health, upon presentation of a certificate of the cause of death, signed by the medical attendant. Keepers of all Cemeteries in the Township are hereby forbidden to receive any body for interment unless accompanied by such permit."

CLOSING REMARKS.

In articles on alleged nuisances, published in previous Annual Reports of this Board, attention was called to the fact that a very large proportion of the communications received at this Office in regard to alleged nuisances, came from local health officers and other township, city and village officials, asking for information relative to points of law concerning nuisances, or requesting advice as to their duties, or to the proper legal procedure necessary to effect the prevention or abatement of nuisances. The correspondence of 1894 shows a similar desire on the part of local health officials for advice and coöperation of this Board, which has been freely and cheerfully given, and, it is believed, with beneficial results to the public health.

Although the State Board of Health has no local jurisdiction in the abatement of nuisances, its power being advisory, the action taken by the Office of the Board imparts useful information to those concerned, and often favorably influences those who have authority, in having nuisances abated.

INDEX.

[In this index, unless otherwise stated, the localities mentioned are in Michigan.]

Page

Abstracts of proceedings of meetings of State Board of Health lxxix-lxxx
Accessions to the library (see library).
Actinomycosis (see lump-jaw) in Michigan in 1894 470-472
Adrian, absolute humidity at, by months, in 1894, Table IV 22
atmospheric pressure at, by months, in 1894, Table XVII, Diagram XVI 72-73
average daily range of atmospheric pressure at, by months, in 1894, Table XV 69
average daily range of temperature at, by months, in 1894, Table III 26
average temperature at, by year and months, for 1894, Table I, Diagram I 20-21
extremes and range of temperature at, in 1894, Table II 22-23
latitude, longitude, altitude, average temperature and atmospheric pressure at, in 1894, Exhibit 2 3
meteorological conditions at, in 1894, used in studying sickness, Exhibit VIII 115
meteorological phenomena at, in 1894 12-14
ozone, day at, in 1894, Table VIII, Diagram VIII 50-51
ozone, night at, in 1894, Table IX, Diagram IX 52-53
range of atmospheric pressure at, by months, in 1894, Table XVI 70
relative humidity at, by months, in 1894, Table V 24
Agricultural College, absolute humidity at, average by months for 1894, compared with 1893, and for 28 years, 1866-93, Exhibit 18 30
absolute humidity at, by months, in 1894, Table IV 22
atmospheric pressure at, by months, in 1894, Table XVII 72
average atmospheric pressure at, by months, in 1894, compared with 1893, and with average for 19 years, 1875-93, Exhibit 36 71
average daily range of atmospheric pressure at, by months, in 1894, Table XV 69
average daily range of temperature at, by months, in 1894, Table III 26
average daily range of temperature at, by year and months, for 1894, compared with 1893, and averages for 20 years, 1874-93, Exhibit 14 25
average temperature at, by year and months, for 1864-94, and average for 30 years, 1864-93, Exhibit 5 6
average temperature at, by year and months, for 1894, compared with 1893, and averages for 30 years, 1864-93, Exhibit 10 19
average temperature at, by year and months, for 1894, Table I 21
cloudiness at, in 1894, Table VI 43
cloudiness, average per cent of, by year and months, 1894, compared with 1893, and with average for 30 years, 1864-93, Exhibit 25 44
extremes and range of temperature at, for each of 7 years, 1888-94, and for 1894 compared with averages for 1873-93, Exhibit 16 29
extremes and range of temperature at, in 1894, Table II 22-23
latitude, longitude, altitude, average temperature and atmospheric pressure at, in 1894, Exhibit 2

	Page
Agricultural College, meteorological characteristics at, in 1894	11-13
meteorological conditions at, in 1894, used in studying sickness, Exhibit VIII	113
meteorological conditions by year and months for 1894, compared with averages for 1893, and for periods of years, at, Exhibit 7	9-10
rainfall at, in 1894, Table VII	43
rainfall at, by year and months, 1894, compared with 1893, and with averages for 30 years, 1864-93, Exhibit 29	47
range of atmospheric pressure at, by months, in 1894, Table XVI	70
relative humidity at, average by months, for 1894, compared with 1893, and with averages for 30 years, 1864-93, Exhibit 20	31
relative humidity at, by months, in 1894, Table V	34
wind at, direction, months in 1894, Table XIII, Diagram XV, Diagram XII, Table XIV	62-68
Albion, absolute humidity at, by months, in 1894, Table IV	33
atmospheric pressure at, by months, in 1894, Table XVII	73
average daily range of temperature at, by months, in 1894, Table III	26
average temperature at, by year and months, for 1894, Table I	21
cloudiness at, in 1894, Table VI	43
direction of wind at, by months, in 1894, Table XIV	65-68
extremes and range of temperature at, in 1894, Table II	22-23
fog at, in 1894, Exhibit 23	38-41
latitude, longitude, and altitude of, in 1894, Exhibit 2	3
ozone, day, at, in 1894, Table VIII	50
ozone, night, at, in 1894, Table IX	51
rainfall at, in 1894, Table VII	43
range of atmospheric pressure at, by months, in 1894, Table XVI	70
relative humidity at, by months, in 1894, Table V	34
sunny and cloudy days at, by months, in 1894	78-79
Alexander, S., meteorological observer at Birmingham, in 1894	3
Allen, F. E., correspondence with, relative to diphtheria at Laingsburg	200
Allendale Tp., Ottawa Co., neglected outbreak of measles at	351
Alma, chicken-pox at, in 1894	416
Alpena, average daily range of temperature at, by months, in 1894, Table III	26
extremes and range of temperature at, in 1894, Table II	22-23
latitude, longitude and altitude of, in 1894, Exhibit 2	3
meteorological conditions at, in 1894, used in studying sickness, Exhibit VIII	113
ozone, day, at, in 1894, Table VIII	50
ozone, night, at, in 1894, Table IX	51
rainfall at, in 1894, Table VII	43
velocity of wind at, miles per hour, by months, 1894, Table XI, Diagram XI	58-59
Alton, M. D., R. W., correspondence with, relative to neglected outbreak of diphtheria at Portland, Ionia Co	201-203
Andrews, M. D., W. H., report from, relative to restricted measles in Clyde Tp., Allegan Co	360
Ann Arbor, absolute humidity at, by months, in 1894, Table IV, Diagram III	32-35
atmospheric pressure at, by months, in 1894, Table XVII, Diagram XVI	72-73
average daily range of atmospheric pressure at, by months, in 1894, Table XV	69
average daily range of temperature at, by months, in 1894, Table III, Diagram II	26-27
average temperature at, by year and months, for 1894, Table I	21
cloudiness at, in 1894, Table VI, Diagram VI	42-43
depth of well, of ground above water in well, and temperature of water at, by months, in 1894, Exhibit 8	16-17
extremes and range of temperature at, in 1894, Table II	22-23
fog at, in 1894, Exhibit 23	38-41
latitude, longitude, altitude, Av. Temp., and atmospheric pressure at, in 1894, Exhibit 2	3
man fatally burned by kerosene at	453
meteorological conditions at, in 1894, used in studying sickness, Exhibit VIII	113

	Page
Ann Arbor meteorological phenomena at, in 1894	13-14
ozone, day, at, in 1894, Table VIII, Diagram VIII	50-51
ozone, night, at, in 1894, Table IX, Diagram IX	52-53
rainfall at, in 1894, Table VII, Diagram VII	48-49
range of atmospheric pressure at, by months, in 1894, Table XVI	70
relative humidity at, by months, in 1894, Table V, Diagram IV	34-35
sunny and cloudy days at, by months, in 1894	79
velocity of wind at, miles per hour by months, 1894, Table XI, Diagram XI	58-59
wind at, direction, months in 1894, Table XIII, Diagram XV, Diagram XII, Table XIV	62-66
Annual Report, printing and distribution of	lxxv
Antitoxine, discussion relative to production of, by State Board of Health	xxii-xxiii
Ash, J. W., meteorological observer at Ashton in 1894	2
Ashton, atmospheric pressure at, by months in 1894, Table XVII	72
average daily range of atmospheric pressure at, by months in 1894, Table XV	69
average daily range of temperature at, by months, in 1894, Table III	26
average temperature at, by year and months for 1894, Table I	21
cloudiness at, in 1894, Table VI	43
direction of wind at, by months, in 1894, Table XIV	65-66
fog at, in 1894, Exhibit 23	38-41
latitude, longitude and altitude of, in 1894, Exhibit 2	2
ozone, day, at, in 1894, Table VIII	50
ozone, night, at, in 1894, Table IX	52
rainfall at, in 1894, Table VII	48
range of atmospheric pressure at, by months, in 1894, Table XVI	70
sunny and cloudy days at, by months, in 1894	76-77
Atmosphere, temperature and conditions of, in Mich.	18-26
Atmospheric pressure, average by months, 1894, at 13, and average line for 10 stations in Mich., Table XVII	73
average by months, 1894, compared with 1893, and with averages for 17 years, 1877-93, at stations in Mich., Exhibit 35	71
average, by months, 1894, compared with 1893, and with averages for 19 years, 1875-93, at Agr'l. College, Exhibit 36	71
average daily range of, by months, for 1894, at each of 12, and average for 10 stations in Mich., Table XV	69
average daily range of, by months, in 1894, compared with 1893, and with averages for 12 years, 1882-93, at stations in Mich., Exhibit 37	74
by months at each of 8, and average for 10 stations in Mich., in 1894, Diagram XVI	73
by months for 1894, at each of, and average for 9 stations in Mich., Table XVI	70
range of, by months, for 1894, compared with 1893, and with averages for 13 years, 1882-93, at stations in Mich., Exhibit 38	74
Attorney for State Board of Health, and for opposition during investigation	cxxx
Attorney General, opinion of, relative to eligibility and qualifications of a health officer	xcv-xcvi
opinion of, relative to liability of a county for care of indigent sick with dangerous communicable disease	civ
Aurelius Tp., Ingham Co., outbreak of scarlet fever in	253
Auroras, observed and recorded at stations in Mich., in 1894, Exhibit 26	45
Baird, M. D., R. B., letter from Dr. Baker to	261
Baker, M. D., Henry B., address relative to Miller Bill	cxiii-cxvii
report on method for disposing of excreta at Harbor Point	lxxxiii-lxxxv
report relative to State quarantine law	lxxxvi-xci
Secretary's reply to Rep. Miller	cviii-cx, cxvii-cxxv
Baldrey, Alfred, letter from, relative to diphtheria carried from Cincinnati to St. Joseph	199
Baldwin, H., McP., Observer, U. S. Weather Bureau, meteorological reports from Alpena in 1894	2
Bancroft, outbreak of scarlet fever at	255
Barn-yards and hog-pens, alleged nuisances, correspondence relative to, names of observers, etc.	507-508
Barr, Prof. C. E., meteorological observer at Albion in 1894	2

	Page
Barringer, Dr., investigation of hydrophobia at Cohoctah Tp., Livingston Co.	456-457
Bartholomew, M. D., D. D., letter from, relative to scarlet fever in Holly village	260
Batavia Tp., man fatally burned, probably by kerosene, at	480
Battle Creek, absolute humidity at, by months, in 1894, Table IV	31
atmospheric pressure at, by months, in 1894, Table XVII	72
average daily range of atmospheric pressure at, by months, in 1894, Table XV	69
average daily range of temperature at, by months, in 1894, Table III	26
average temperature at, by year and months, for 1894, Table I	21
cloudiness at, in 1894, Table VI, Diagram VI	42-43
depth of well, of ground above water in well, temperature of water at, by months, in 1894, Exhibit 8	16-17
extremes and range of temperature at, in 1894, Table II	22-23
fog at, in 1894, Exhibit 23	38-41
latitude, longitude, altitude, average temperature, and atmospheric pressure at, in 1894, Exhibit 2	3
meteorolcgical conditions at, in 1894, used in studying sickness, Exhibit VIII	118
meteorological phenomena at, in 1894	14
ozone, day at, in 1894, Table VIII	50
ozone, night at, in 1894, Table IX	52
range of atmospheric pressure at, by months, in 1894, Table XVI	70
relative humidity at, by months, in 1894, Table V	34
wind at, direction, months in 1894, Table XIII, Diagram XV, Diagram XII, Table XIV	62-68
Beers, C. E., meterological observer at Adrian, in 1894	3
Belding, Ionia Co., glanders (in a horse) at, correspondence relative to	465-466
Bell, M. D., Wm., reports from, relative to scarlet fever in Otisco township, Ionia Co.	253
Bennington township, Shiawassee Co., outbreak of scarlet fever at	257-258
request from, relative to restriction of measles at	258
Bialy Bill, introduction and consideration of	cxxviii
remarks on	xxxiii-xxxiv
remarks on, and consideration of	xxxix-xl
Bills, approved by State Board of Health, titles and progress	ci-cii
Biniodide of mercury as a preventive treatment for scarlet fever	261-262
Birmingham, absolute humidity at, by months, in 1894, Table IV, Diagram III	32-33
atmospheric pressure at, by months, in 1894, Table XVII, Diagram XVI	72-73
average daily range of atmospheric pressure at, by months, in 1894, Table XV	69
average daily range of temperature at, by months, in 1894, Table III, Diagram II	26-27
average temperature at, by year and months, for 1894, Table I, Diagram 1	20-21
cloudiness at, in 1894, Table VI, Diagram VI	42-43
extremes and range of temperature at, in 1894, Table II	22-23
fog at, in 1894, Exhibit 23	38-41
latitude, longitude, altitude, average temperature and atmospheric pressure at, in 1894, Exhibit 2	3
meteorological conditions at, in 1894, used in studying sickness, Exhibit VIII	118
ozone, day at, in 1894, Table VIII	50
ozone, night at, in 1894, Table IX	53
rainfall at, in 1894, Table VII, Diagram VII	48-49
range of atmospheric pressure at, by months, in 1894, Table XVI	70
relative humidity at, by months, in 1894, Table V, Diagram IV	34-35
wind at, direction, months in 1894, Table XIII, Diagram XV, Diagram XII, Table XIV	62-68
Blaine township, Crawford Co., alleged nuisance at	492
Blind, School for the, bad system of heating and ventilation at	lxxx-lxxxiii
Boxsell, C. L., Observer, U. S. Weather Bureau, meteorological reports from Sault Ste. Marie	3
Bowels, Inflam. of, causing more or less sickness than the average of diseases, in 1894, by State Divisions, Exhibit VII	116-117
order of prevalence of, for each of years, 1882-94, and average for 1882-93, Exhibit A	113

Page

Bowels, Inflam. of, per cent of observers of, weeks present, per cent and weekly reports of, and average order of prevalence of, in State and divisions of the State, Table 3... 100-109
per cent of observers reporting presence of, for each of several years, and in two periods of years, and by months, in years, 1893-94, and two periods of years, Table 1... 97-99
per cent of reports stating presence of, by months, in 1894, and averages for periods of years, Exhibit II... 88
per cent of reports stating presence of, by years, 1882-94, and averages for periods of years, also, by months, for 1893-94, and for periods of years, Exhibit IV... 91-93
prevalence of, in 1894, as regards time and area, by Divisions, Table 4... 110-111
rise and fall of, by months, in 1894, Diagram 4... 133
causing less sickness than the average of diseases, in 1894, by State Divisions, Exhibit VII... 116-117
Brain, Inflam. of, order of prevalence of, for each of years, 1882-94, and average for 1882-93, Exhibit A... 112
per cent of observers of, weeks present, per cent and weekly reports of, and average order of prevalence of, in State and divisions of State, Table 3... 100-109
per cent of observers reporting presence of, for each of several years, and in two periods of years, and by months, in years, 1893-94, and two periods of years, Table 1... 97-99
per cent of reports stating presence of, by months, in 1894, and averages for periods of years, Exhibit II... 88
per cent of reports stating presence of, by years, 1882-94, and averages for periods of years, also, by months, for 1893-94, and for periods of years, Exhibit IV... 91-93
prevalence of, in 1894, as regards time and area, by divisions, Table 4... 110-111
rise and fall of, by months, in 1894, Diagram 4... 133
Bronchitis and meteorological conditions, by year and months, 1894, Exhibit X... 123
causing in Michigan, in 1894, more sickness than the average of diseases, Exhibit VI... 115
causing more sickness than the average of diseases, in 1894, by State Divisions, Exhibit VII... 116-117
order of prevalence of, for each of years, 1882-94, and average for 1882-93, Exhibit A... 112
per cent of observers of, weeks present, per cent and weekly reports of, and average order of prevalence of, in State and divisions of the State, Table 3... 100-109
per cent of observers reporting presence of, for each of several years, and in two periods of years, and by months, in years, 1893-94, and two periods of years, Table 1... 97-99
per cent of reports stating presence of, by months, in 1894, and averages for periods of years, Exhibit II, Diagram I... 88-89
per cent of reports stating presence of, by years, 1882-94, and average for periods of years; also, by months, for 1893-94, and for periods of years, Exhibit IV... 91-93
prevalence of, in 1894, as regards time and area, by Divisions, Table 4... 110-111
relations of, to meteorological conditions... 120-121
sickness from, by year and months, in 1894, in each of years, 1877-93, and averages for 17 years, 1877-93, and 8 years, 1886-93, Exhibit XI... 122
summary of relations of, to climatic conditions, Exhibit XXV... 148
Bronson village, Branch Co., an alleged nuisance at... 507
Brookfield township, Huron Co., glanders suspected (in a horse) at, correspondence, names of reporters, etc... 466-467
Bulletins, health, and quarterly reports... lxxviii-lxxix
Buda-pesth, report of Michigan delegates to International Congress of Hygiene at... xci-civ
Congress of Hygiene at, Dr. Vaughan elected delegate to... xvi
Bulletins of health in Michigan, in 1894... 84
Butler, D. B., correspondence with, relative to outbreak of scarlet fever in Frankfort... 256
Byron township, Kent Co., disinterment of body dead from diphtheria at, in 1894... 448
Cahalan, Dr James, correspondence with, relative to transportation of diphtheria from Wyandotte to Detroit... 226-227
Calkins, M. D., John S., meteorological observer at Thornville, in 1894... 2

Page

Cancer of breast and tubercular diseases, possible relation between 428-429
Carbon dioxide in the atmosphere, report relative to xxi
Card-reports (see reports).
Caro village, alleged nuisance at 507-508
Cascade township, Kent Co., chicken-pox at, in 1894 417-418
Cattle, foot and mouth disease, in Michigan, in 1894 454-455
tuberculosis in, in Michigan, in 1894 443-446
Cattermole, M. D., George H., investigation of small-pox at Watson by lxiii-lxiv
Cedar Tp., Mackinac Co., measles spread in, by roving band of Indians 356-357
Cerebro-spinal meningitis, causing less sickness than the average of diseases in 1894, by State Divisions, Exhibit VII 116-117
order of prevalence of, for each of years, 1882-91, and average for 1882-93, Exhibit A 113
per cent of observers of, weeks present, per cent and weekly reports of, and average order of prevalence of, in State and divisions of State, Table 2 100-109
per cent of observers reporting presence of, for each of several years, and in two periods of years, and by months, in years, 1893-94, and two periods of years, Table 1 97-99
percent of reports stating presence of, by months, in 1894, and averages for periods of years, Exhibit II 88
per cent of reports stating presence of, by years, 1882-94, and average for periods of years; also, by months, for 1893-94, and for periods of years, Exhibit IV 91-93
prevalence of, in 1894, as regards time and area, by Divisions, Table 4 110-111
rise and fall of, by months, in 1894, Diagram 5 123
Charlotte, sanitary convention at xii-lv
special meeting of State Board of Health at, Nov. 22, 1894 xxi-xxii
Chesaning, Saginaw Co., rabies at, correspondence, etc 459-460
Chesaning Tp., Saginaw Co., restricted outbreak of measles at 361
Chicken-pox (varicella) in Mich., in 1894 416-418
Cholera infantum and diarrhea and meteorological conditions, by months, in 1894, Exhibit XIX 126
causing in Michigan, in 1894, less sickness than the average of diseases, Exhibit VI 115
causing more or less sickness than the average of diseases in 1894, by State Divisions, Exhibit VII 116-117
in 1894, compared with 1893, and with averages for 17 years, 1877-93, and for 8 years, 1886-1893, Exhibit XX 127
order of prevalence of, for each of years 1882-94, and average for 1882-93, Exhibit A 113
per cent of observers of, weeks present, per cent and weekly reports of, and average order of prevalence of, in State and divisions of State, Table 2 100-109
per cent of observers reporting presence of, for each of several years, and in two periods of years, and by months, in years, 1893-94, and two periods of years, Table 1 97-99
per cent of reports stating presence of, by months, in 1894, and averages for periods of years, Exhibit II, Diagram 1 88-89
per cent of reports stating presence of, by years, 1882-94, and average for periods of years; also, by months, for 1893-94, and for periods of years, Exhibit IV 91-93
prevalence of, in 1894, as regards time and area, by divisions, Table 4 110-111
relations of, to certain meteorological conditions 135
summary of relations of, to climatic conditions, Exhibit XXVI 144
Cholera morbus and dysentery and meteorological conditions, by months, in 1894, Exhibit XXIV 142
causing in Michigan, in 1894, less sickness than the average of diseases, Exhibit VI 115
causing less sickness than the average of diseases in 1894, by State Divisions, Exhibit VII 116-117

Page

Cholera morbus in 1894, compared with 1893, and with averages for 17 years, 1877-93, and for 8 years, 1886-93, Exhibit XX ... 137
order of prevalence of, for each of years, 1882-94, and average for 1882-93, Exhibit A ... 113
per cent of observers of, weeks present, per cent and weekly reports of, and average order of prevalence of, in State and divisions of State, Table 2 ... 100-109
per cent of observers reporting presence of, for each of several years, and in two periods of years, and by months, in years, 1893-94, and two periods of years, Table 1 ... 97-99
per cent of reports stating presence of, by months, in 1894, and averages for periods of years, Exhibit II, Diagram 1 ... 88-89
per cent of reports stating presence of, by years, 1882-94, and average for periods of years; also, by months, for 1893-94, and for periods of years, Exhibit IV ... 91-93
prevalence of, in 1893, as regards time and area, by divisions, Table 4 ... 110-111
relations of, to certain meteorological conditions ... 135
summary of relations of, to climatic conditions, Exhibit XXVI ... 144
Cincinnati, O., diphtheria carried from, to St. Joseph ... 199
Clare city, a dam at, an alleged nuisance ... 510
Clark, A. Arnold, mention of paper on consumption by ... 426
Clarke, John, Clerk, correspondence with, relative to the spread of typhoid fever through the agency of flies ... 306-307
Clerks of health boards, annual reports of, for 1894 ... lxxiii
in office of S. B. of H., and expenditures for 1895 ... civ-cvi
Clifford village, Lapeer Co., slaughter-house at, an alleged nuisance ... 500
Climate and sickness in Mich. ... 120
Climatic conditions and cold-weather diseases ... 143
warm-weather diseases ... 144
Clothing, old rags, etc., outbreaks of diphtheria attributed to infection from, localities, names of reporters and quotations from reports ... 196-197
Cloudiness, Av. per cent, by months, at each of 6 and average for 9 stations in Mich., in 1894, Diagram VI ... 43
by months, at each of 12 and average for 9 stations in Mich., in 1894, Table VI ... 43
by year and months, 1894, compared with 1893, and with average for 17 years, 1877-93, at stations in Mich., Exhibit 24 ... 44
by year and months, 1894, compared with 1893, and with averages for 30 years, 1864-93, at Agr'l College, Exhibit 25 ... 44
Clouds and sunshine at stations in Mich., in 1894 ... 75-80
Clyde Tp., Allegan Co., restricted outbreak of measles at ... 260
Cogshall, M. D., Bela, mention of paper on consumption by ... 428
Cohoctah township, Livingston Co., hydrophobia at, investigation and correspondence ... 456-457
Cold weather diseases (see diseases).
Coleman village, school-house at, an alleged nuisance, correspondence, names of reporters, etc. ... 494-496
Colon township, St. Joseph Co., advice asked relative to nuisances ... 491
night soil, garbage, etc., at, an alleged nuisance ... 509
nuisance at, correspondence, quotations from letters relating to, names of reporters, etc. ... 488-491
Columbia township, Jackson Co., disobedience of public-health laws, prosecution for ... 251
Committee to investigate the State Board of Health, report of ... cxxxv-cxxxvi
minority report ... cxxxvii
Communicable diseases (see diseases).
dangerous, quarterly reports of (see diseases).
disinterment and removal of bodies dead from, in Michigan, in 1894 ... 447-451
in Michigan, in 1894 ... 148-174
indigents sick with, a charge on the county, medical attendance, etc. ... 309-310
Compilation of sickness reports, some purposes of ... 152
Compiling, methods employed in, relative to ages ... 220
proof-reading, editing, etc., third quarter of 1894 ... xliii

	Page
Compiling, proof-reading, editing, etc., last quarter of 1894	li-lii
first quarter of 1895	lix
second quarter of 1895	lxvii
scarlet fever, relative to ages, etc.	209
Concord, Jackson Co., neglected outbreak of measles at	350-351
Conference of Health Officers, second annual, consideration of consumption, subjects of papers, by whom read, etc.	434-436
of Michigan Health Officers, second annual, proceedings, etc.	xiv
National, of State Boards of Health at Washington	xcvi-xcix
Consumption, ages of prevalence, and mortality from	439-441
and cancer of breast, question of possible relation between	438-439
and pleuritis and meteorological conditions, by months, in 1894, Exhibit XVII	131
average duration of fatal and non-fatal cases of	441-442
blank form of official demand for special reports of	431
by sex and age-groups, the fatal cases of, Table 9	440
by sex and age-groups, the per cent of fatal cases of, and average age at death, Table 10	441
by sex, the duration in months and years of fatal cases of, Table 11	441
by sex, the duration of cases still sick, in months and years, Table 12	442
by tiers of counties, in Michigan, in 1894, Table 2	422
cases and deaths from, by age-groups, in 1894, and per cent the cases and deaths in each age-group were of all the cases and deaths, Table 8	440
cases of, reported as having recovered, by age, sex and duration of sickness	442-443
causing in Michigan, in 1894, more sickness than the average of disease, Exhibit VI	115
causing more or less sickness than the average of diseases in 1894, by State Divisions, Exhibit VII	116-117
consideration of, at Second Annual Conference of Health Officers, papers on, by whom read, etc.	434-436
correspondence relative to shipment of bodies dead from	437-438
deaths from, per 100,000 inhabitants for each of years, 1862-94, Table 4, Diagram	425
distribution of, by counties, in Michigan, in 1894, Map	423
distribution of, in Michigan, in 1894	419-423
how restricted, some instances regarding	430
how spread, instances, localities, names of reporters, etc.	427-429
in Michigan in 1894	419-446
in 1894, compared with 1893	424
information relative to reporting cases of	427
localities, cases and deaths, average cases and deaths per locality, and ratio of deaths to cases, in 1893-94, Table 3	424
neglected cases in Emerson township, Chippewa Co.	430
new circular asking for final reports	lxxvi
number and per cent of cases reported taken sick, in each month, for years 1890-94, Table 5	426
number of cases and deaths, per 10,000 inhabitants, by counties, in 1894, Table 1	421
number of deaths from, in each month in 1894, Table 6	427
order of prevalence of, for each of years, 1882-94, and average for 1882-93, Exhibit A	113
outbreaks of, reports relative to during nine months of 1894, Table II	li
outbreaks of, reports relative to, during third quarter of 1894, Table I	xlii
last quarter of 1894, Table I	xlix
first quarter of 1895, Table I	lvii
second quarter of 1895, Table I	lxvi
papers by Bela Cogshall, M. D., of Flint; Bion Whelan, M. D., of Hillsdale, and A. Arnold Clark, on	426
papers on, at State Medical Society	433
per cent of reports stating presence of, by months, in 1894, and averages for periods of years, Exhibit II	88
per cent of reports stating presence of, by years, 1882-94, and average for periods of years; also, by months, for 1893-94, and for periods of years, Exhibit IV	91-98

Page

Consumption, per cent of observers of, weeks present, per cent and weekly reports of, and average order of prevalence of, in State and divisions of State, Table 3 100-109
per cent of observers reporting presence of, for each of several years, and in two periods of years, and by months, in years, 1893-94, and two periods of years, Table 1 97-99
prevalence of, in 1894, as regards time and area, by Divisions, Table 4 110-111
probably spread by a school teacher 428-429
proposition from Dr. Heasley relative to instruction regarding 429
publication of circular letter relative to, third quarter of 1894 xlv
publication of slip relative to restriction of, third quarter, 1894 xlv
publications of the State Board of Health relative to restriction of, requests for 432-433
requests for information relative to reporting 433-437
restrictive measures followed at Tecumseh, results 430-433
rise and fall of, by months, in 1894, Diagram 4 123
sickness from, by year and months, 1878-94, and in 1894 compared with averages for two periods of years, Exhibit XVIII 123
source of contagium of, in Michigan, in 1894 427
special consideration of, at meeting of Michigan State Medical Society, subjects of papers, by whom read, etc 433
studied in the Detroit High School 433
summary of relations of, to climatic conditions, Exhibit XXV 143
the adoption of Michigan's plan for restriction of, by other states 433
the Michigan plan for the restriction of liv
transportation of corpses dead of lxi
Consumptives, demand for State Hospital for 434
State Hospital for, bill for, proposed by State Board of Health xviii-xxx
Contagious disease statistics do not show all the lives saved by public health work 162
Contagium of consumption, source of 427-430
diphtheria, movements of in 1894, places from and to which traced, names of reporters, quotations from reports 191-194
diphtheria, movements of, in Michigan, in 1894, Table 8 and Map 184-190
diphtheria, vitality of 213
measles, movements of, in Michigan, in 1894, Map 338-350
measles, source of, in Michigan, in 1894, Table 7 337
scarlet fever, movements of 337-338
scarlet fever, source of 236-253
small-pox, movement of, from outside the State 339
small-pox, movements of, in 1894, Map 338
small-pox, source of 334-339
typhoid fever, movements of, in Michigan, in 1894, Map 286
typhoid fever, source of, in Michigan, in 1894, Exhibit I 285
Contaminated water, outbreaks of typhoid fever attributed to, localities, names of reporters and quotations from reports 295-296
Convention, sanitary, at Charlotte xii
at Union City xi-xii
Conventions, sanitary, at Union City and Charlotte lv
in Michigan, in 1894 xi-xii
Corwith township, Otsego Co., slaughter-house at, an alleged nuisance 497-498
Croup, membranous, and pneumonia and meteorological conditions, by months, in 1894, Exhibit XII 124-125
by months, in 1894, compared with monthly averages for 17 years, 1877-93, Exhibit XIII 126
causing more or less sickness than the average of diseases in 1894 by State Divisions, Exhibit VII 116-117
order of prevalence of, for each of years, 1882-94, and average for 1882-93, Exhibit A 113
per cent of observers of, weeks present, per cent and weekly reports of, and average order of prevalence of, in State and divisions of State, Table 3 100-109

Page

Croup, membranous, per cent of observers reporting presence of, for each of several years, and in two periods of years, and by months, in years, 1893-94, and two periods of years, Table 1 97-99
per cent of reports stating presence of, by months, in 1894, and averages for periods of years, Exhibit II 88
per cent of reports stating presence of, by years, 1882-94, and averages for periods of years; also, by months for 1893-94, and for periods of years, Exhibit IV 91-93
prevalence of, in 1894, as regards time and area, by Divisions, Table 4 110-111
rise and fall of, by months, in 1894, Diagram 3 125
summary of relations of, to climatic conditions, Exhibit XXV 143
Crystal Falls, Iron Co., small-pox at, in 1894 402-403
Danby township, Ionia Co., small-pox at, in 1894 395
Dangerous communicable diseases (see diseases).
Day township, Montcalm Co., nuisance at 492
Dayton township, Newaygo Co., slaughter-house at, an alleged nuisance 498
Dead body, from diphtheria, disinterment of, at Byron township, Kent Co., in 1894 448
from diphtheria, proposed removal of, from Erin township, Macomb Co. 448
from diphtheria, removal from Luther village, Lake Co. 449
from diphtheria, removal of, at Otisco township, Ionia Co. 447-448
removal of, from Detroit to Metamora township, Lapeer Co., without proper precautions, correspondence, etc. 450-451
transportation of, from Toledo, O., to Monroe, Mich., in 1894 449-450
Dearing, H. P., G. B. Agt., M. C. R. R., letter from, relative to shipment of body dead from scarlet fever from Detroit to Metamora township, Lapeer Co. 451
Death-rates, increasing decrease of, from communicable diseases 169-170
Deerfield township, diphtheria at, supposed to be contracted from a cat 210-212
Detour township, Chippewa Co., outbreak of scarlet fever at 256-257
Detroit, average daily range of temperature at, by months, for 1894, Table III 26
Board of Health decide to placard and isolate measles, letter 361
casualties consequent on the use of kerosene at, for the years, 1889-94, under the different tests, Table 3 474
casualties from the use of gasoline at, in 1894 486-487
diphtheria at, in 1894 225
extremes and range of temperature at, in 1894, Table II 22-23
fog at, in 1894, Exhibit 23 38-41
Journal, Secretary's reply to Rep. Miller in cviii-cx
High School, consumption studied in 433
latitude, longitude and altitude of, in 1894, Exhibit 2 3
list of casualties from use of kerosene at, in 1894 476-477
meteorological conditions at, in 1894, used in studying sickness, Exhibit VIII 118
meteorological phenomena at, in 1894 12-14
rabies at, correspondence, etc. 463
rainfall at, in 1894, Table VII 48
removal of dead body from, to Metamora Tp., Lapeer Co., without proper precautions, correspondence, etc. 450-451
small-pox at, in 1894 406
statement of losses, etc., from use of kerosene, in 1894 477
sunny and cloudy days at, by months, in 1894 80
transportation of case of diphtheria to, from Wyandotte 225-227
Tribune, quotation from, relative to typhoid fever at State House of Correction 300
velocity of wind at, miles per hour, by months, 1894, Table XII, Diagram XII 58-59
woman fatally burned by kerosene at 483-484
Diagram I, average temperature by months at 8, and average line for 11 stations in Mich., in 1894. 20
II, average daily range of temperature, by months, for 1894, at each of 7 and average for 16 stations in Mich. 27
III, absolute humidity by months, in 1894, at each of 6, and average for 7 stations in Mich. 33

Page

Diagram IV, relative humidity, by months, at each of 6, and average line for 7 stations in Mich., in 1894 35
V, number of observations of fogs in each month of 1894 37
VI, Av. per cent of cloudiness in Mich., by months, in 1894, at each of 6, and average for 9 stations 41
VII, rainfall, by months, in 1894, at each of 8, and average line for 16 stations in Mich... 49
VIII, ozone, day, by months, in 1894, at each of 7, and average line for 9 stations in Mich.. 51
IX, ozone, night, by months, in 1894, at each of 7, and average line for 9 stations in Mich. 53
X, velocity of wind, by hours and months, in 1894, at Lansing 57
XI, velocity of wind, miles per hour, by months, in 1894, at each of and average for 8 stations in Mich. 59
XII, wind, direction of, by months, in 1894, at each of 10 stations in Mich. 64
XIII, wind, direction, in Mich., average 12 years, 1878-89 60
XIV, wind, direction of, by months, average for 10 stations in Mich., in 1894 61
XV, wind, direction of, by months, 1894, at each of and average for 10 stations in Mich... 62
XVI, atmospheric pressure, by months, at each of 8, and average for 10 stations in Mich., in 1894 73
1, weekly reports of sickness in Michigan, in 1894 89
2, weekly reports of sickness in Michigan, in 1894 125
3, weekly reports of sickness in Michigan, in 1894 127
4, weekly reports of sickness in Michigan, in 1894 133
5, weekly reports of sickness in Michigan, in 1894 135
1, number of deaths from scarlet fever, per 100,000 inhabitants, 24 years, 1868-91 284
1, reported deaths from measles in Mich., 25 years, 1868-93 336
1, diphtheria, deaths from, in each of 26 years, 1868-93, per 100,000 inhabitants 181
2, isolation and disinfection restricted diphtheria in Mich., in 1894 216
1, deaths per 100,000 inhabitants from scarlet fever for 24 years, 1868-91 171
2, scarlet fever, decreasing death-rate from, per 100,000, for years, 1868-94 171
3, scarlet fever, increasing life-saving from, for years 1868-94 172
4, deaths from small-pox, 26 years, 1869-94 173
4, small-pox, deaths from, per 10,000 inhabitants, 26 years, 1869-94 333
5, decreasing death-rate from small-pox, 26 years, 1869-94 173
6, small-pox, increasing life-saving from, 26 years, 1868-94 173
7, decreasing death-rate from typhoid fever, 1869-94 174
comparison of death-rates from scarlet fever, small-pox and typhoid fever before, and after restriction of, by State Board of Health 165
consumption, fluctuation of, by years for years, 1869-91 425
isolation and disinfection restrict scarlet fever and diphtheria during the 8 years, 1887-94 157
isolation and disinfection restrict scarlet fever, in Michigan, in 1894 266
measles, isolation and disinfection restricted, in 1894 268
numbers of cases and deaths from scarlet fever, diphtheria, measles and typhoid fever in outbreaks where isolation and disinfection were enforced and where neglected, for five years, 1890-94 155
of locality of source of contagium of typhoid fever at McBain village 304
typhoid fever, age distribution of deaths from, in 1894 319
typhoid fever, deaths from, 27 years, 1868-94 174
typhoid fever, isolation and disinfection restricted, in Michigan, in 1894 313
typhoid fever, locality of, at Duncan township, Houghton Co. 300
typhoid fever, relative to condition of Marquette water supply 303
typhoid fever, reported deaths from, per 100,000 persons living, 27 years, 1868-94 278
typhoid fever, sickness from, and low water in wells, for 14 years, 1878, 1880-93 323
Diagrams made during second quarter of 1894 lxviii
of instructive experience in Michigan (see also Leaflets and Pamphlets) lxxix
tables, etc., in first quarter of 1895 lix
Diamond, M. D., W. N., correspondence with, relative to neglected measles at Meridian township, Ingham Co. 352-353

Page

Diarrhea, and cholera infantum and meteorological conditions, by months, in 1894, Exhibit XIX. 126
causing in Michigan, in 1894, more sickness than the average of diseases, Exhibit VI.... 115
causing more sickness than the average of diseases in 1894, by State Divisions, Exhibit VII.... 116-117
in 1894, compared with 1893, and with averages for 17 years, 1877-93, and for 8 years, 1886-93, Exhibit XX.... 127
order of prevalence of, for each of years, 1882-94, and average for 1882-93, Exhibit A.... 113
per cent of observers of, weeks present, per cent and weekly reports of, and average order of prevalence of, in State and divisions of State, Table 2.... 100-109
per cent of observers reporting presence of, for each of several years, and in two periods of years, and by months, in years, 1893-94, and two periods of years, Table 1.... 97-99
per cent of reports stating presence of, by months, in 1894, and averages for periods of years, Exhibit II, Diagram 1.... 88-89
per cent of reports stating presence of, by years, 1882-94, and average for periods of years; also by months, for 1893-94, and for periods of years, Exhibit IV.... 91-98
prevalence of, in 1894, as regards time and area, by Divisions, Table 4.... 110-111
relations of, to meteorological conditions.... 134-135
summary of relations of, to climatic conditions, Exhibit XXVI.... 144
Diphtheria, age of greatest prevalence of, and mortality from.... 219-223
and tonsilitis and meteorological conditions, by months, in 1894, Exhibit XIV.... 128
at Deerfield township, contracted from a cat.... 210-213
at Laingsburg, during third quarter of 1894.... xlvi
at Portland during third quarter of 1894.... xlvi
at Portland township, Ionia Co., law relative to public-health.... 213-214
average duration of fatal and non-fatal cases.... 224
average number of cases and deaths per outbreak, isolation and disinfection enforced, neglected, etc.... 217
body of person dead with, shipped from Port Huron to Memphis, Michigan.... 212-213
by months in 1894.... 131-132
by sex and age-groups, number of deaths in 1894, per cent the deaths in each age-group were of deaths at all ages, Table 16.... 223
by sex and age-groups, the non-fatal cases, and per cent the cases in each age-group were of all cases, Table 17.... 223
by sex, the duration of fatal cases of, Table 19.... 224
by sex, the duration of non-fatal cases of, Table 20.... 224
by year and months in 1894 compared with 1893, and with averages for 17 years, 1877-93, and for 8 years, 1886-93, Exhibit XIII.... 126
carried by persons who did not have the disease, localities, names of reporters and quotations from reports.... 197-198
carried from Cincinnati, Ohio, to St. Joseph.... 199
cases and lives saved from, by isolation and disinfection.... 215
cases of, traced to preceding cases, locality, name of reporter and place to which traced.... 133
causing more (or less) sickness, than the average of diseases in 1894, by State Divisions, Exhibit VII.... 116-117
contagium, vitality of.... 212
contracted by kissing.... 212
contracted from a drinking cup.... 198
deaths from, per 100,000 inhabitants for each of the 27 years, 1868-94, Table 4; Diagram 1, for 26 years, 1868-93.... 131
disinterment of body dead from, in Byron township, Kent Co., in 1894.... 448
distribution of, by counties, in 1894, Table 1 and Map.... 177-178
distribution of, by tiers of counties, Table 2.... 179
distribution of, in Michigan, in 1894.... 175-180
expenditures caused by, in Huron Co., in 1894.... 209-210
fatal cases by sex and age-groups, average age at death, number of deaths and per cent deaths in each age-group were of all deaths, Table 18.... 223

Page

Diphtheria, first, second and third localities, second infected from first and third from second, names of localities, numbers of cases and deaths ... 184-189
how spread, transgressions of public-health laws ... 198
in 1894, compared with previous years ... 179-180
in age-groups, cases and deaths in 3 years, 1892-94, per cent the cases and deaths in each age-group were of all the cases and deaths, Table 15 ... 221
in age-groups, numbers of cases and deaths, per cent the cases and deaths in each age-group were of all cases and deaths, Table 14 ... 220
in Detroit and Grand Rapids, in 1894 ... 225
in Huron Co., in 1894, correspondence relative to ... 208-210
in Huron Co., localities, cases and deaths and sources of infection, for 1892-94, Table ... 210
in Laingsburg, correspondence relative to ... 199-200
in Michigan, in 1894 ... 175-177
in Tekonsha township, traced to sore throat, correspondence relative to ... 195
isolation and disinfection restricted, in Michigan, in 1894, Diagram 2 ... 216
isolation and disinfection restricted in Michigan, in 8 years, 1887-94, Diagram ... 157-158
movements of contagium in 1894, localities, place to which traced, names of reporters and quotations from reports ... 191-194
movements of contagium in 1894, Table 8 and Map ... 184-190
neglected outbreak of, in Portland village, Ionia Co., correspondence relative to ... 201-203
number and per cent of cases of, present in each month of 1894 ... 182
numbers of cases and deaths from, prevented by isolation and disinfection, in 1887-94, and in period of years, Table 11 ... 218
numbers of cases and deaths per outbreak, where isolation and disinfection were neglected, and where enforced, in 5 years, 1890-94, Table 3 and Diagram ... 154-155
numbers of outbreaks, localities, cases and deaths from, ratio of deaths to cases for 13 years, 1882-94, 1894 compared with 1893 and with averages for 1894-93, Table 3 ... 180
numbers of outbreaks which began, ended and were present, in each month of 1894 ... 181
order of prevalence of, for each of years, 1882-94, and average for 1882-93, Exhibit A ... 113
outbreaks, cases and deaths and average cases and deaths per outbreak, isolation and disinfection neglected, and enforced, for 8 years, 1887-94, Table 3 ... 156
outbreaks in which isolation and disinfection were enforced, localities, names of reporters and instances quoted ... 214
outbreaks of, attributed to infection from old rags, clothing, etc., localities, names of reporters and quotations from reports ... 196-197
outbreaks of, probably traced to former outbreaks ... 193-194
reports relative to, during third quarter of 1894 ... xlii
reports relative to, during the last quarter of 1894 ... xlix
reports relative to, during first quarter of 1895, Table 1 ... lvii
reports relative to, during second quarter of 1895, Table 1 ... lxvi
reports relative to, during year 1894, Table II ... li
traced to preceding cases outside of Michigan ... 193
traced to preceding outbreaks ... 183-194
traced to "sore throat," localities and names of reporters and quotations from reports ... 194-195
traced to unsanitary conditions ... 195-196
per cent of observers of, weeks present, per cent and weekly reports of, and average order of prevalence of, in State and divisions of State, Table 2 ... 100-109
per cent of observers reporting presence of, for each of several years, and in two periods of years, and by months, in years, 1893-94, and two periods of years, Table 1 ... 97-99
per cent of reports stating presence of, by months, in 1894, and averages for periods of years, Exhibit II ... 88
per cent of reports stating presence of, by years, 1882-94, and average for periods of years; also, by months, for 1893-94, and for periods of years, Exhibit IV ... 91-93
period of incubation of, in days, and average period of incubation, Table 13 ... 219
period of incubation of, in days, in 110 instances, Table 12 ... 219
prevalence of, in 1894, as regards time and area, by divisions, Table 4 ... 110-111
prevention of, by use of immunizing blood serum, discussion ... xix

	Page
Diphtheria, proposed removal from Otisco Tp., Ionia Co., of body, dead from	447–448
removal from Luther village, Lake Co., of body dead, from	449
removal of body dead from, in Erin Tp., Macomb Co	448
restriction of	158
rise and fall of, by months, in 1894, Diagram 2	125
saving of lives and cases by isolation and disinfection of, in each of 5 years, 1890–94, Table 4	160
source of contagium of cases of, in 1894, Table 7	182
source of contagium of, in Mich., in 1894	182–212
summary of relations of, to climatic conditions, Exhibit XXV	142
supposed to have been carried by animals	197
transportation of case of diphtheria from Wyandotte to Detroit	225–227
transportation of person sick or dead from	212–213
Disease, average, and total sickness, explanation relative to	145
per cent of weekly card-reports stating presence of, average order of prevalence, for 1894	147
sickness from, by year and months, in each of 18 years, 1877–94, and in two periods of years compared with 1894, Exhibit XXVII	146
Diseases, a summary relative to, for 1894, in each of the 11 divisions of State, prevalence as regards time and area, Table 4	110–111
average number on each report, and number of reports received for years, 1884–94, Exhibit B	113
"cold weather," and meteorological conditions	121–122
"cold weather," summary of relations of, to certain climatic conditions, Exhibit XXV	142
communicable, in Mich., in 1894	148–174
increasing decrease of death-rates, from	169–170
number of places from which reported in Mich., by weeks, in 1894	151
contributions to the study of causes of	81–148
dangerous communicable, blanks for removal of body dead from	449
disinterment and removal of bodies dead from, in Mich., in 1894	447–451
distribution of information how to restrict	lxxiv–lxxv
during third quarter of 1894	xli–xlii
during last quarter of 1894	xlviii–xlix
during first quarter of 1895	lvii–lviii
during second quarter of 1895	lxv
removal of body dead from, from Detroit to Metamora Tp., Lapeer Co., without proper precautions	450–451
special reports relative to	lxxii
summary relative to, for year 1894	1
difference in order of prevalence of, in various years	114
from which there seems to have been the most sickness in Michigan, in 1894, Exhibit VI	115
from which there was an increase or a decrease, in 1894	86
method of comparison of, by years, months and weeks	86
number of weekly reports of, and names of observers of, from each division in Michigan, by months, in 1894, Exhibit V	94–96
order of prevalence of, in each of years, 1882–94, and average for 1882–93, Exhibit A	113
per cent of observers reporting each of 28, for each of the years, 1882–94, average for 1877–93, and for eight years, 1886–93, Table 1	97
per cent of observers reporting the several, by months, for years, 1893–94, and average by months, for 1886–93, and 1877–93, Table 1 (Con.)	98–99
per cent of reports stating presence of each of the 28, by months, in 1894, average for 17 years, 1877–93, and eight years, 1886–93, Exhibit II	88
per cent of reports stating presence of, for each year, 1882–94, and average for 17 years, 1877–93, and 8 years, 1886–93, Exhibit IV	91–93
per cent of the weekly reports stating presence of, for years, 1877–93, 1886–93, and by months in 1894, from each of 11 geographical divisions, table 2 (Con.)	102–109
prevalence of the several, in 1894	85–86
purposes of the compilation of statistics relative to	153

Page

Diseases, rise and fall of the average for 28, by months in 1894, Diagram 4 133
the 15, which caused the most sickness in the 11 geographical divisions of the State, in 1894, Exhibit VII 116-117
warm weather, relation of, to meteorological conditions 135
"warm-weather" summary of relations of, to certain climatic conditions, Exhibit XXVI 144
weekly reports of, by year and months, and summary relative to, in Michigan, in 1894, Table 3 100-101
which cause most sickness in Michigan 113
Disinfection and isolation (see isolation).
by steam, relative to xcix-c
should be done by the health officer, letter from Dr. Baker 263
Ditches and drains alleged nuisances 510-511
Divisions, geographical, of State, names of observers of sickness from each of, and localities represented, Exhibit V 94-96
of State, 11, for convenience in studying sickness and death, Exhibit I 87
Drainage, defective, outbreaks of typhoid fever attributed to, location, names of reporters and quotations from reports 304
Drains and ditches alleged nuisances 510-511
Dried beef, poisoning from, in Michigan, in 1894 453-454
Duncan township, Houghton Co., incident relative to indigent sick with dangerous communicable disease, a charge on county, medical attendance, etc. 309-310
typhoid fever at, correspondence and diagram 299-300
Dysentery and cholera morbus and meteorological conditions, by months, in 1894, Exhibit XXIV. 142
causing in Michigan, in 1894, less sickness than the average of diseases, Exhibit VI 115
causing more or less sickness than the average of diseases, 1894, by State Divisions, Exhibit VII 116-117
in 1894, compared with 1893, and with averages for 17 years, 1877-93, and for 8 years, 1886-93, Exhibit XX 127
order of prevalence of, for each of years, 1882-94, and average for 1882-93, Exhibit A 113
per cent of observers of, weeks present, per cent and weekly reports of, and average order of prevalence of, in State and divisions of State, Table 3 100-109
per cent of observers reporting presence of, for each of several years, and in two periods of years, and by months, in years, 1893-94, and two periods of years, Table 1 97-99
per cent of reports stating presence of, by months, in 1894, and averages for periods of years, Exhibit II, Diagram 1 88-89
per cent of reports stating presence of, by years, 1882-94, and average for periods of years; also, by months, for 1893-94, and for periods of years, Exhibit IV 91-93
prevalence of, in 1894, as regards time and area, by Divisions, Table 4 110-111
summary of relations of, to climatic conditions, Exhibit XXVI 144
Edgar, Hon. W. R., report of committee to investigate State Board of Health cxxxv-cxxxvi
Editing, printing, etc., by quarters of 1894 (see compiling).
proof reading and compiling (see compiling).
Edmondson, Wm. M., Observer U. S. Weather Bureau, meteorological reports from Port Huron, in 1894 2
Edwards, M. D., Wm. M., meteorological observer at Kalamazoo, in 1894 2
Ellington township, Tuscola Co., rabies at, correspondence, etc. 460-462
Emerson township, Chippewa Co., neglected case of consumption at 490
Erin township, Macomb Co., proposed disinterment and removal of body dead from diphtheria from 448
Erysipelas, causing more or less sickness than the average of diseases in 1894, by State divisions, Exhibit VII 116-117
in Michigan, in 1894 447
order of prevalence of, for each of years, 1882-94, and average for 1882-93, Exhibit A 113
per cent of observers of, weeks present, per cent and weekly reports of, and average order of prevalence of, in State and divisions of State, Table 3 100-109
per cent of observers reporting presence of, for each of several years, and in two periods of years, and by months, in years, 1893-94, and two periods of years, Table 1 97-99

Page

Erysipelas, per cent of reports stating presence of, by months, in 1894, and averages for periods of years, Exhibit II 88
per cent of reports stating presence of, by years, 1882-94, and average for periods of years; also, by months, for 1893-94, and for periods of years, Exhibit IV 91-93
prevalence of, in 1894, as regards time and area, by Divisions, Table 4 110-111
rise and fall of, by months, in 1894 127
Evans, Edward A., Director, Michigan Weather Service, meteorological reports from Detroit, in 1894 2
Exhibit 1, names of observers, places of observation, where located 2
2, latitude, longitude, altitude, average temperature and atmospheric pressure at stations in Michigan, in 1894 3
3, average temperature by year and months for each of the years 1877-94, and average for the 17 years, 1877-93, at stations in Michigan 4
4, average temperature, by year and months for each of years, 1879-94, and average for 15 years, 1879-93, at State Board of Health, Lansing 5
5, average temperature by year and months for 1864-94, and average for 30 years, 1864-93, at Agricultural College 6
6, meteorological conditions by year and months, in 1894, compared with averages for 1893 and for periods of years, at groups of stations 7-8
7, meteorological conditions by year and months in 1894, compared with averages for 1893, and for periods of years at Agricultural College 9-10
8, depth and temperature of water in wells at certain stations in Michigan in 1894 16-17
9, average temperature by year and months in 1894, compared with averages for 1893, and the 17 years, 1877-93, at stations in Michigan 18
10, temperature, average by year and months in 1894, compared with 1893, and the averages for 30 years, 1864-93, at Agricultural College 19
11, temperature, average, by year and months in 1894, compared with 1893, and the 15 years, 1879-93, at Lansing 19
12, average temperature, by year and months, 1894, at State Board of Health, Lansing 24
13, average daily range of temperature, by year and months, for 1894, compared with 1893, and averages for 15 years, 1879-93, at stations in Michigan 24
14, average daily range of temperature, by year and months, 1894, compared with 1893, and averages for 20 years, 1874-93, at Agricultural College 25
15, extremes and range of temperature, by months, in each of years, 1888-94, and in 1894 compared with average for 1877-93, at stations in Michigan 28
16, extremes and range of temperature by months for 7 years, 1888-94, and for 1894 compared with average for 1873-93, at Agricultural College 29
17, average absolute humidity, by months, in 1894, compared with 1893, and with averages for 17 years, 1877-93, at stations in Michigan 30
18, average absolute humidity, by months, in 1894, compared with 1893, and with averages for 28 years, 1866-93, at Agricultural College 30
19, average relative humidity, by months, for 1894, compared with averages for 1893, and for 16 years, 1878-93, at stations in Michigan 31
20, average relative humidity, by months, in 1894, compared with 1893, and with averages for 30 years, 1864-93, at Agricultural College 31
21, foggy days in Michigan, by months, in 1894 36
22, number of observations of fog in each month of 1894 36
23, different days on which fog was recorded, in 1894, at stations in Michigan 38-41
24, cloudiness, average per cent of, by year and months, 1894, compared with 1893, and average for 17 years, 1877-93 44
25, cloudiness, average per cent of, by year and months, 1894, compared with 1893, and with averages for 30 years, 1864-93, at Agricultural College 44
26, auroras observed and recorded at stations in Michigan, in 1894 45
27, solar and lunar halos, dates when recorded, in 1894 46-47
28, rainfall, average, by year and months, 1894, compared with 1893, and with averages for 17 years, 1877-93, at stations in Michigan 46
29, rainfall, by year and months, 1894, compared with 1893, and with averages for 30 years, 1864-93, at Agricultural College 47

Page

Exhibit 30, ozone, day, by months, for 1894, compared with 1893, and with averages for 17 years, 1877-93, at stations in Michigan 54
31, ozone, night, by months, for 1894, compared with 1893, and with averages for 17 years, 1877-93, at stations in Mich. 54
32, velocity of wind, by months, in 1894, compared with 1893, and with averages for 12 years, 1882-93, at stations in Mich. 55
33, velocity of wind, by months, in 1894, compared with 1893, and with averages for years, 1880-93, at Lansing 55
34, direction of wind, by months, 1878-89 60
35, average atmospheric pressure, by months, in 1894, compared with 1893, and averages for 17 years, 1877-93, at stations in Mich. 71
36, average atmospheric pressure, by months, 1894, compared with 1893, and with averages for 19 years, 1875-93, at Agr'l College 71
37, average daily range of atmospheric pressure, by months, in 1894, compared with 1893, and with averages for 12 years, 1882-93, at stations in Mich. 74
38, range of atmospheric pressure, by months, in 1894, compared with 1893, and with averages for 12 years, 1882-93, at stations in Mich. 74
I, eleven geographical divisions of the State, and counties in each division 87
II, per cent of reports stating presence of each of 28 diseases, average in Michigan, in 1894, and for 17 years, 1877-93, and 8 years, 1886-93 88
III, stating by months for 1894, for State and for each geographical division, from which weekly reports were received, number of observers, etc. 90
IV, per cent of reports stating presence of each of 28 diseases for each year, 1882-94, and average for 17 years, 1877-93, and 8 years, 1886-93 91-93
V, names of observers* whose weekly reports of diseases for 1894 are compiled in Tables 1, 2, 3 and 4 94-96
VI, diseases from which there seems to have been the most sickness in Michigan, in 1894. 115
VII, by state divisions, the 15 diseases from which there seems to have been the most sickness, in 1894 116-117
VIII, names of stations where meteorological observations, used in certain exhibits, were made 118
IX, certain meteorological conditions in Michigan, in 1894, compared with preceding years 119
X, bronchitis and meteorological conditions, by year and months, 1894 122
XI, sickness from bronchitis, by year and months in 1894, in each of years, 1877-93, and average for 17 years, 1877-93, and 8 years, 1886-93 123
XII, pneumonia and membranous croup, and meteorological conditions by months, in 1894 124
XIII, per cent of reports of certain diseases, by months, in 1894, compared with 1893, and average for 17 years, 1877-93 126
XIV, diphtheria and tonsilitis and meteorological conditions, by months, in 1894 128
XV, influenza and scarlet fever and meterological conditions by months, in 1894 129
XVI, rheumatism and neuralgia and meteorological conditions, by months, in 1894 130
XVII, consumption and pleuritis and meteorological conditions, by months in '894 131
XVIII, sickness from consumption, by year and months, for 1878-94, and in 1894, compared with averages for two periods of years 132
XIX, diarrhea and cholera infantum and meteorological conditions by months, in 1894 136
XX, per cent of reports of certain diseases, by year and months, 1894, compared with 1893, and with averages for 17 years, 1877-93, and 8 years, 1886-93 137
XXI, intermittent and remittent fever and meteorological conditions, by months, in 1894. 139
XXII, typhoid and typho-malarial fever and meteorological conditions by months, in 1894 140
XXIII, measles and whooping-cough and meteorological conditions, by months, in 1894 141
XXIV, cholera morbus and dysentry and meteorological conditions, by months, in 1894 142

*It has been customary to place the name of each observer, and the location represented, in the index, but on account of the great number, this has been omitted, and reference only to Exhibit V is made in the index.

Page

Exhibit XXV, summary of Exhibits X., XII., XIV., XV., XVI., pages 128-142, relative to certain diseases and climatic conditions 143
XXVI, summary of Exhibits XIX., XXI., etc., pages 136-142, relative to certain diseases and climatic conditions 144
XXVII, sickness from average disease, by year and months, in each of 18 years, 1877-94, and in two periods of years compared with 1894 146
XXVIII, average disease and meteorological conditions, by year and months, in 1894 147
I, geographical divisions of State by counties, to facilitate study of sickness and deaths. 87
I, typhoid fever, source of contagium of, in Mich., in 1894 285
II, typhoid fever, cases and lives which should have been saved from typhoid fever, in each of, and average for 5 years, 1890-94 314
III, inches of ground above water, depth of well, and depth of water in well at Lansing. 328-329
A, order of prevalence of 28 diseases, in each of the years, 1882-94, and average for 1882-93. 112
B, stating for each of 11 years, 1884-94, the number of card reports received and average number of diseases on each report 113
Expenditures and clerks in office of State Board of Health for 1894 clv-clvi
of State Board of Health for 1894 cxlix
reply to charges relative to cxxv-cxxvi
total amount and classifications of, for year ending June 30, 1895 cxliv
Expenses of State Board of Health for 1894, and estimates for succeeding years cvi-cviii
Exposure, typhoid fever attributed to, names of localities, reporters and quotations from reports 306
Extra work during third quarter of 1894 xlv
Eyes, is testing of, and fitting glasses practicing a branch of medicine lxii-lxiii
Fairbanks, M. D., E., correspondence with, relative to measles, spread from infected person at a revival meeting 361-362
Felger, Geo. W., Observer, U. S. Weather Bureau, meteorological reports from Grand Haven, in 1894 2
Fife Lake village, alleged nuisance at 501-502
Filth, in Seney township, an alleged nuisance 513
outbreaks of typhoid fever attributed to, location, names of reporters and quotations from reports 305
Filthy conditions, a family in Leonidas township, St. Joseph Co., and alleged nuisance, correspondence, etc. 496-497
Final report relative to typhoid fever (blank form) 149-150
Flagler, M. D., W., correspondence with, relative to prevention of fumigation at Imlay City 355-356
Flies, reported as the probable means of spreading typhoid fever 306-307
Fog, days of, observed by months, in Michigan, in 1894, Exhibit 21 36
Fog, in Michigan in 1894 36-41
number of different days on which recorded in 1894, at stations in Michigan, Exhibit 23 38-41
number of observations of, in each month in 1894, Exhibit 22, Diagram V 36-37
Follett, Dr. S. B., report from, relative to outbreak of scarlet fever at Sturgis 254
Foot and mouth disease, in Michigan, in 1894 454-455
Force, Wm. M., meteorological observer at office State Board of Health, in 1894 2
Fort Howard, Wis., small-pox spread from, to Menominee 404-406
Frankfort, outbreak of scarlet fever at 255-256
Fraser township, Bay Co., an alleged nuisance at 511
Fremont, alleged nuisance at 492-496
and Dayton township, Newaygo Co., slaughter-house at, an alleged nuisance 496
French, M. D., S. S., letter from relative to diphtheria contracted through kissing 212
Fuller, Otis, Warden, State House of Correction, letter relative to typhoid fever 301
Gaines township, Kent county, neglected outbreak of measles at 255
Gasoline, casualties and loss caused by the use of, in Michigan, outside of Detroit, in 1894, Table I 455
casualties from the use of in Detroit, in 1894 456-457
injuries and loss of life and property caused by the use of, in Michigan, in 1894 456-457
property damaged by, in Manistee 456
the source of danger in the use of 455
woman burned by, in Kalamazoo 455

Page

Gates, M. D., W. C., meteorological observer at Rockland in 1894 2
Geographical divisions of State, for convenience in study of sickness and deaths, Exhibit I 87
German measles (see rötheln).
Glanders in Michigan, in 1894 464-467
(in a horse) in Belding, correspondence relative to 465-466
in Kalkaska village, correspondence relative to 464
(in a horse) in Rich township, Lapeer Co., correspondence relative to 465
(in a horse) in Tecumseh village, correspondence relative to 464-465
suspected (in a horse) in Brookfield township, Huron Co., correspondence, names of reporters, etc 466-467
Glasses, the fitting of, a branch of the practice of medicine lxii-lxiii
Gobleville, Van Buren Co., alleged typhus fever at, in 1894 374-376
Gongwer, A. C., reply to charges by, by Dr. Baker cxvii-cxxvi
Grand Haven, average daily range of temperature at, by months, in 1894, Table III 26
extremes and range of temperature at, in 1894, Table II 22-23
fog at, in 1894, Exhibit 23 38-41
latitude, longitude and altitude of, in 1894, Exhibit 2 2
meteorological conditions at, in 1894, used in studying sickness, Exhibit VIII 118
meteorological phenomena at, in 1894 12-14
ozone, day, at, in 1894, Table VIII 50
ozone, night, at, in 1894, Table IX 52
rainfall at, in 1894, Table VII 48
velocity of wind at, miles per hour, by months, 1894, Table XI, Diagram XI 58-59
Grand Rapids, diphtheria at, in 1894 225
kerosene casualty at, in 1894 482-483
measles carried from, to Hastings, Barry Co., correspondence relative to 351-352
Grand River, dead fish in, an alleged nuisance 511-512
Green Oak township, Livingston Co., hydrophobia suspected at, correspondence, etc 458
Greene, M. D., C. E., letters from, relative to typhoid fever at Riley township, St. Clair Co 306
Ground water, depth and temperature of, in wells at certain stations in Michigan, in 1894, Exhibit 8 16-17
height of, in well at Lansing, by months, for each of the 10 years, 1885-94, and average for the 8 years, 1886-93, Table 17 333
height of, number of cases of typhoid fever reported, number of outbreaks which began, by months, each of 9 years, 1886-94, Table 18 335
in well at Lansing, how determined for series of years, Exhibit III 328-329
in well at Lansing, sickness from typhoid fever and total annual rainfall compared, Table 23 330
measurements and temperature of, in 1894 15
Hale, M. D., Geo. P., correspondence with, relative to shipment of body dead from diphtheria, from Pt. Huron to Memphis, Michigan 212-213
Hall, Jr., Asaph, Director, Detroit observatory, meteorological reports from, in 1894 2
Halos, solar and lunar, observed in 1894, Exhibit 27 46-47
Hamtramck township, Wayne Co., cemeteries at, an alleged nuisance 513-515
Hanna, M. D., J. K., letter from, relative to neglected outbreak of measles in Gaines township, Kent Co 355
Harbor Point, report on method for disposing excreta at lxxxiii-lxxxv
Harkin, M. D., F., correspondence with and diagram from, relative to typhoid fever at Marquette 301-302
Harrisville, absolute humidity at, in 1894, by months, Table IV 33
atmospheric pressure at, by months, in 1894, Table XVII 73
average daily range of atmospheric pressure at, by months, in 1894, Table XV 69
average daily range of temperature at, by months, in 1894, Table III, Diagram II 26-27
average temperature at, by year and months, for 1894, Table I, Diagram 1 20-21
cloudiness at, in 1894 43
extreme and range of temperature at, in 1894, Table II 22-23
latitude, longitude, altitude and average temperature of, in 1894, Exhibit 2 2
meteorological conditions at, in 1894, used in studying sickness, Exhibit VIII 118
meteorological phenomena at, in 1894 13

Page

Harrisville, ozone, day, at, in 1894, Table VIII, Diagram VIII 50-51
ozone, night, at, in 1894, Table IX, Diagram IX 52-53
rainfall at, in 1894, Table VII, Diagram VII 48-49
range of atmospheric pressure at, by months, in 1894, Table XVI 70
relative humidity at, by months, in 1894, Table V 84
wind at, direction, months in 1894, Table XIII, Diagram XV, Diagram XII, Table XIV. 62-68
Hartford township, Van Buren Co., alleged nuisance at 499
Hastings, Barry Co., measles carried to, from Grand Rapids, correspondence relative to 351-352
Hauxhurst, M. D., J. W., inspection of and report relative to diphtheria in Huron Co. 206-209
investigation, on part of State, of scarlet fever at Holly 259-260
Hazleton township, Shiawassee Co., diphtheria at, letter relative to 196
Health and weather in Michigan, during third quarter of 1894, compared with average for eight years, 1886-93 xlviii
last quarter of 1894, compared with average of fourth quarters for the eight years, 1886-93 lvi-lvii
first quarter of 1895, compared with average for the nine years, 1886-94 lxv
second quarter of 1895, compared with average for the nine years, 1886-94 lxxi
bulletins and quarterly reports lxxviii-lxxix
in Michigan, in 1894 84
in Michigan for quarterly reports of (see diseases, dangerous communicable).
legislation in Michigan, in 1895 c-civ
officer, authority of, in case of disagreement with the physician 260-261
officers and clerks, annual reports from, for 1894 lx
annual reports of, for year 1894 lxiii
eligibility and qualifications of, opinion of Attorney General xcv-xcvi
instructions to newly appointed lxxviii
names and addresses of, for 1895-96 lxix
published list of names and addresses of lxxiv
returns of names and addresses of lxxi-lxxii
Heasley, M. D., H. W., correspondence with, relative to yellows in peaches, the alleged cause of typhoid fever 307-309
proposition from, relative to spreading instruction regarding restriction of consumption 429
Heath, M. D., Geo. F., letter from, relative to neglected measles at Monroe 357-358
Hektographing in connection with sickness statistics last quarter, 1894 lv-lvi
work during first quarter of 1895 lix
second quarter of 1895 lxviii-lxix
Hillsdale, depth of well, of ground above water in well, and temperature of water at, by months, in 1894, Exhibit 8 16-17
Hog cholera in Lansing township, Ingham Co., and Pontiac, correspondence, names of reporters, etc. 468-469
Michigan in 1894 468-469
Hog-pens and barn-yards, alleged nuisances, correspondence relative to, names of observers, etc. 507-508
Holden, Hon. Charles, report of committee to investigate the State Board of Health cxxxv-cxxxvi
Holly, scarlet fever at, investigated by the State 259-260
Horses, dead, alleged nuisances 488-494
Hospital for consumptives, bill to establish, proposed by the State Board of Health xxviii-xxx
House, M. D., W. B., report from, relative to outbreak of scarlet fever at Detour township, Chippewa Co. 256-257
Houston, M. D., I. W., letter from, relative to restricted measles at Marshall 360
Huff, M. D., C. W., correspondence relative to typhus fever in Michigan, in 1894 374-376
Humidity, absolute, at each of 12, and average line for seven stations in Michigan, in 1894, Table IV 33
by months, at each of 6, and average for 7 stations, in Michigan, in 1894, Diagram III 33

Page

Humidity, absolute, by months, for 1894, compared with 1893, and with averages for 28 years, 1866-93, at Agr'l College, Exhibit 18 30
in 1894, compared with 1893, and with averages for 17 years, 1877-93, at stations in Michigan, Exhibit 17 30
relative, at each of 12, and average line for 7 stations, in Michigan, in 1894, Table V 34
by months, at each of 6, and average for 7 stations in Michigan, in 1894, Diagram IV 35
for 1894, compared with averages for 1893, and for 16 years, 1878-93, at stations in Michigan, Exhibit 19 31
for 1894, compared with 1893, and with average for 30 years, 1864-93, at Agr'l College, Exhibit 20 31

Huron Co., diphtheria in, correspondence relative to 203-210
diphtheria in, expenditures caused by, in 1894 209-210
localities, cases and deaths from diphtheria and sources of infection, in 1893-94, Table 210
petition for inspection by State Board of Health, of diphtheria at 205

Hydrophobia in Chesaning village, Saginaw Co., correspondence, etc 459-460
Cohoctah township, Livingston Co., correspondence relative to, and investigation of 456-457
Detroit, correspondence, newspaper clippings, etc 462
Indian River and Ellington townships, Tuscola Co., correspondence, etc 460-462
Michigan, in 1894 456-464
Northville, correspondence, etc 463-464
Saginaw City, W. S., correspondence, etc 460
suspected in Green Oak township, Livingston Co., correspondence, etc 458
suspected in Ovid, Clinton Co., correspondence, etc 456

Hygiene, International Congress of, at Buda-Pesth, report of Michigan delegates to xci-civ

Hyndman, M. D., D., correspondence with, relative to biniodide of mercury as a preventive of scarlet fever 261-262

Hyser, M. D., Wm., report from, relative to outbreak of scarlet fever at Plainfield township, Kent Co. 257

Imlay City, fumigation of cases of measles at, prevented 255-256

Impure water, outbreaks of typhoid fever attributed to, localities, names of reporters and quotations from reports 295-296

Indian River township, Tuscola Co , rabies at, correspondence, etc 460-462

Indians, roving band of, spread measles in Cedar township, Mackinac Co 256-257

Indigents sick with a dangerous communicable disease a charge on the county, medical attendance on, etc liv, 209-210

Indigents sick with a dangerous communicable disease a charge on the county, opinion of Attorney General civ

Influenza and scarlet fever and meteorological conditions, by months, in 1894, Exhibit XV 129
by year and months, in 1894, compared with 1893, and with averages for 17 years, 1877-93, and for 8 years, 1886-94, Exhibit XIII 126
causing in Michigan, in 1894, more sickness than the average of diseases, Exhibit VI 115
causing more sickness than the average of diseases in 1894, by State Divisions, Exhibit VII 116-117
order of prevalence of, for each of years, 1882-94, and average for 1882-93, Exhibit A 113
per cent of observers reporting presence of, for each of several years, and in two periods of years, and by months, in years, 1893-94, and two periods of years, Table 1 97-99
per cent of observers of, weeks present, per cent and weekly reports of, and average order of prevalence of, in State and Divisions of State, Table 2 100-109
per cent of reports stating presence of, by months, in 1894, and averages for periods of years, Exhibit II 88
per cent of reports stating presence of, by years, 1892-94, and average for periods of years; also, by months, for 1893-94, and for periods of years, Exhibit IV 91-93
prevalence of, in 1894, as regards time and area, by Divisions, Table 4 110-111
rise and fall of, by months, in 1894, Diagram 3 125
summary of relations of, to climatic conditions, Exhibit XXV 143

	Page
Inspection, sanitary, of various localities	xlvi
Instruments, change of exposure of, at Lansing, in 1884	15
Intermittent fever and meteorological conditions, by months, in 1894, Exhibit XXI	139
causing in Michigan, in 1894, more sickness than the average of diseases, Exhibit VI	115
causing more or less sickness than the average of diseases, in 1884, by State Divisions, Exhibit VII	116-117
in 1894, compared with 1893, and with averages for 17 years, 1877-93, and for 8 years, 1886-93, Exhibit XX	137
order of prevalence of, for each of years, 1882-94, and average for 1882-93, Exhibit A	113
per cent of observers of, weeks present, per cent and weekly reports of, and average order of prevalence of, in States and Divisions of State, Table 2	100-109
per cent of observers reporting presence of, for each of several years, and in two periods of years, and by months, in years, 1893-94, and two periods of years, Table 1	97-99
per cent of reports stating presence of, by months, in 1894, and averages for periods of years, Exhibit II	88
per cent of reports stating presence of, by years, 1882-94 and average for periods of years; also, by months, for 1893-94, and for periods of years, Exhibit IV	91-93
prevalence of, in 1894, as regards time and area, by Divisions, Table 4	110-111
rise and fall of, by months, in 1894, Diagram 5	139
summary of relations of, to climatic conditions, Exhibit XXVI	144
International Congress of Hygiene at Buda-Pesth, report of Michigan delegates to	xci-civ
delegate sent to	xvi
Inter-State notification of small-pox	414
Introduction	x
Investigation asked for by State Board of Health, resolution, etc.	cxxix-cxxxv
committee, report of	cxxxv-cxxxvi
committee, special for investigating State Board of Health	cxxx
of State Board of Health, resolutions demanding	xxxiii
special, by the Secretary of State Board of Health	lv
Ionia, State House of Correction at (see State House of Correction).	
Iron Mountain, typhoid fever at, in 1894	298-299
Isolation and disinfection, cases and lives saved from diphtheria by	215
cases and lives saved from measles by	362-363
enforced, neglected, doubtful, etc., average numbers of cases and deaths per outbreak, Table 10	217
enforced, neglected, doubtful, etc., in outbreaks of scarlet fever, number of cases and deaths per outbreak, Table 9	265
in cases of diphtheria, localities, names of reporters and instances reported	214
lives and cases saved from scarlet fever by	264
measles, enforcement of, results	360-363
numbers of cases and deaths from, prevented by isolation and disinfection in 1887-94, and in period of years, Table 11	218
of scarlet fever, instances, localities and names of reporters	262-263
of scarlet fever, lives and cases saved by, for each of, and average for years, 1887-94, Table 10	267
of typhoid fever, cases and deaths per outbreak, where enforced, neglected, doubtful, etc., 1894, Table 8	312
restricted diphtheria, in Michigan, in 1894, Diagram 2	216
restricted measles, in 1894, Diagram	366
restricted scarlet fever and diphtheria in Michigan, in 8 years, 1887-94, Diagram	157
restricted scarlet fever in Michigan, in 1894, Diagram	266
restricted typhoid fever in Michigan, in 1894, Diagram	313

Page

Johnson, M. D., Henry, correspondence with, relative to diphtheria in Huron Co. 209-210
Jones, M. D., Geo. W., correspondence with, relative to prevention of fumigation at Imlay City. 355-356
Kalamazoo, average daily range of temperature at, by months in 1894, Table III 26
county, small-pox in, 1894 403-404
depth of well, of ground above water in well, temperature of water at, by months, in 1894, Exhibit 8 16-17
extremes and range of temperature at, in 1894, Table II 23-25
latitude, longitude and altitude of, in 1894, Exhibit 2 3
meteorological conditions at, in 1894, used in studying sickness, Exhibit VIII 113
ozone, day, at, in 1894, Table VIII 50
ozone, night, at, in 1894, Table IX 52
rainfall at, in 1894, Table VII 48
sunny and cloudy days at, by months, in 1894 79-80
woman burned by gasoline at 486
woman fatally burned by kerosene at 480
Kalkaska village, glanders at, in 1894, correspondence relative to 464
Kedzie, Prof. R. C., meteorological observer at Agr'l College in 1894 2
meteorological observations by, compiled in Exhibits 10 and 14 19-25
meteorological reports from, compiled in Exhibit 26 71
meteorological reports from, compiled in Exhibit 20 81
Keeler, M. D., William, report from, relative to neglected outbreak of measles at Concord village. 351
Kellogg, M. D., Prof. J. H., meteorological observer at Battle Creek in 1894 2
Kennedy, Duncan, neglected outbreak of diphtheria at Portland, correspondence relative to 208
Kerosene accident at Bay City 481
carelessness in the use of 484
casualties and damage consequent on the use of, in each of years, 1889-94, Table 2 474
casualties consequent on the use of, in Detroit in each of the years, 1889-94, Table 3 474
in Michigan and Detroit, in 1894, Table 1 473
in Michigan, in 1894, compared with previous years. 474
under the different tests for the years, 1889-94, Table 4 475
casualties, list of, in Michigan, outside of the City of Detroit 476
casualty at Grand Rapids, in 1884 482-483
fatality from, in Osceola township, Livingston Co 481
injuries and loss of life and property caused by use of, in 1894 473-484
list of casualties from use of, in Detroit, in 1894 476-477
man fatally burned by, at Ann Arbor 483
man fatally burned, probably by, in Batavia township 480
personal injuries consequent on the use of, in 1894 480-484
some tests of 477-479
woman fatally burned by, in Detroit, correspondence in two cases, names of reporters, etc. 483-484
Kalamazoo 480
Palmyra township, correspondence, etc. 483
severely burned by, in Pinckney, Livingston Co., correspondence, etc. 483
Potterville village, correspondence, etc. 480
Kidney, Inflam. of, causing more or less sickness than the average of diseases in 1894, by State Divisions, Exhibit VII 116-117
order of prevalence of, for each of years, 1882-94, and average for 1882-93, Exhibit A 113
per cent of observers of, weeks present, per cent and weekly reports of, and average order of prevalence of, in State and Divisions of State, Table 2 100-109
per cent of observers reporting presence of, for each of several years, and in two periods of years, and by months, in years, 1893-94, and two periods of years, Table 1 97-99
per cent of reports stating presence of, by months, in 1894, and averages for periods of years, Exhibit II 88
per cent of reports stating presence of, by years, 1882-94, and average for periods of years; also, by months, for 1893-94, and for periods of years, Exibit IV. 91-93

	Page
Kidney, inflam. of, prevalence of, in 1894, as regards time and area, by Divisions, Table 4	110-111
rise and fall of, by months, in 1894	127
Kinne, Dr. Hudson J., report and correspondence relative to scarlet fever in Frankfort	255-256
Laingsburg, diphtheria at, correspondence relative to	199-200
diphtheria at, during third quarter of 1894	xlvi
Langlois, Dr. N. T., correspondence with, relative to transportation of diphtheria to Detroit from Wyandotte	226-227
Lansing (State Board of Health Office) absolute humidity at, by months, in 1894, Table IV, Diagram III	32-33
atmospheric pressure at, by months, in 1894, Table XVII, Diagram XVI	72-73
average daily range of atmospheric pressure at, by months, in 1894, Table XV	69
average daily range of temperature at, by months, in 1894, Table III, Diagram II	26-27
average temperature at, by year and months, for 1894, Table I, Diagram 1	20-21
average temperature at, by year and months, 1894, Exhibit 12	24
average temperature at, by year and months, for years, 1879-94, and average for 15 years, 1879-93, Exhibit 4	5
average velocity of wind, by hours and months, in 1894, table X, Diagram X	56-57
cloudiness at, in 1894, Table VI, Diagram VI	42-43
depth of earth above water in well, temperature of water, and sickness from typhoid fever, averages by months for 8 years, 1886-93, Table 22	327
depth of ground, water in well at, total annual rainfall and sickness from typhoid fever compared, Table 23	330
depth of well, of ground above water in well, and temperature of water at, by months, in 1894, Exhibit 8	16-17
extremes and range of temperature at, in 1894, Table II	22-23
fog at, in 1894, Exhibit 23	38-41
ground water in well at, depth of, how determined for series of years, Exhibit III	328-329
height of ground water at, number of cases of typhoid fever reported, number of outbreaks which began, by months, in each of 9 years, 1886-94, Table 18	325
height of ground water in well at, by months, for each of the 10 years, 1885-94, and average for the eight years, 1886-93	323
latitude, longitude, altitude, average temperature and atmospheric pressure at, in 1894, Exhibit 2	3
meteorological conditions at, in 1894, used in studying sickness, Exhibit VIII	118
meteorological phenomena at, in 1894	12-15
observations for ozone at, in 1894	55
ozone, day, at, in 1894, Table VIII, Diagram VIII	50-51
ozone, night, at, in 1894, Table IX, Diagram IX	52-53
range of atmospheric pressure at, by months, in 1894, Table XVI	70
rainfall at, in 1894, Table VII, Diagram VII	48-49
relative humidity at, by months, in 1894, Table V, Diagram IV	34-35
sunny and cloudy days at, by months, in 1894	78
temperature, average by months, for 1894, compared with 1893, and the 15 years, 1879-93, Exhibit 11	19

Page

Lansing (State Board of Health Office) temperature of water in well at, by months, for each of the 10 years, 1885-94, and average for the 8 years, 1886-93, Table 21 ... 327
velocity of wind at, by months, in 1894, compared with 1893, and with averages for years, 1880-93, Exhibit 33 ... 55
velocity of wind, at, miles per hour, by months, 1894, Table XI, Diagram XI ... 58-59
wind at, direction, months in 1894, Table XIII, Diagram XV, Diagram XII, Table XIV ... 63-68
Lansing township, Ingham Co., hog cholera at, correspondence, names of reporters, etc. ... 408-409
Latitude, longitude, elevation and average temperature at stations in Michigan, in 1894 ... 3
Law, questions of, relating to public-health ... 312-314
Lead poisoning in Michigan, in 1894 ... 452-453
Leaflet relative to small-pox, vaccination, etc. ... 409-410
Leaflets, pamphlets and diagrams, printing and distribution of, in 1894 ... lxxv-lxxviii
Legislation asked by State Board of Health, titles of bills and their progress ... ci-cii
hearing on Miller bill ... cx-cxxviii
memorial for, relative to State Hospital for Consumptives, by Second Annual Conference of Health Officers ... 496
public-health, in Michigan, in 1895 ... lxx, c-civ
public-health, *not* asked for by the State Board of Health ... cii-civ
Legislative investigation asked for by State Board of Health, resolutions, etc. ... cxxix-cxxxv
Legislature, statement of clerks and expenses of State Board of Health for, in 1894 ... civ-cvi
Leonidas township, St. Joseph Co., a family living in a filthy condition, an alleged nuisance, correspondence, etc. ... 496-497
Library, accessions to, by exchange, year ending June 30, 1895 ... cxlvi
by purchase, year ending June 30, 1895 ... cxlv-cxlvi
during third quarter of 1894 ... xlv
last quarter of 1894 ... liii
first quarter of 1895 ... lix-lx
second quarter of 1895 ... lxix
for year ending June 30, 1895 ... cxxxix-cxlvi
loans from, year ending June 30, 1895 ... cxlvi-cxlviii
Life saving, much remains to be done for ... 159
Lives and cases saved from diphtheria by isolation and disinfection ... 215
saved by public-health work, mortality statistics relative to ... 164
saved by public-health work, not all shown by contagious disease statistics ... 162
saved by public-health work, not all shown by mortality statistics ... 167
saved, sickness prevented, and money value saved by isolation and disinfection ... 159
Local meteorological phenomena in the several months of 1894 ... 12-15
Logan, M. D., C. W., correspondence with, relative to spread of measles in Cedar township, Mackinac Co., by roving Indians ... 356-357
Logan, M. D., R., correspondence with, relative to typhoid fever at State House of Correction ... 300-301
Longitude of meteorological stations in Michigan, in 1894 ... 3
Lowry, M. D., G. W., correspondence relative to measles, carried from Grand Rapids to Hastings ... 351-352
Lump-jaw (actimomycosis), in Michigan, in 1894 ... 470-472
correspondence relative to, at Rockland, Ontonagon Co., names of reporters, etc. ... 472
in Onondaga township, Ingham Co., correspondence, names of reporters, etc. ... 470
in Wheatland township, Mecosta Co., correspondence relative to, names of reporters, etc. ... 470-471
outbreak of, in Menominee, correspondence relative to, names of reporters, etc. ... 471-472
Lunar halos, observed in 1894, Exhibit 27 ... 46-47
Luther village, Lake Co., outbreak of measles at, traced to infected person at a revival meeting ... 361-362
removal of body dead from diphtheria, from ... 449
Lyster, M. D., H. F., obituary notice of ... lxxxv-lxxxvi
MacClure, T. R., paper on rabies by, ordered reprinted ... xxx
Macon township, Lenawee Co., chicken-pox at, in 1894 ... 416
Manchester township, Washtenaw Co., small-pox at, in 1894 ... 398-399

	Page
Manistee, foot and mouth disease at, in 1894	454-455
latitude, longitude and altitude of, in 1894, Exhibit 2	3
property damaged by gasoline at	456
Map, diphtheria, distribution of, cases and deaths, by counties, in 1894	178
distribution of consumption, by counties, in Michigan, in 1894	422
distribution of measles, in Michigan, in 1894	333
movements of contagium of diphtheria, in Michigan, in 1894	190
movements of contagium of measles, in Michigan, in 1894	339
movements of contagium of scarlet fever, in Michigan, in 1894	247
movements of contagium of small-pox	355
movements of contagium of typhoid fever, in Michigan, in 1894	355
scarlet fever, localities, outbreaks, cases and deaths, by counties, in 1894	231
typhoid fever, distribution of, in Michigan, in 1894	281
Maple River, Ionia Co., dead fish in, an alleged nuisance	511-512
Marine City, typhoid fever at, analysis of water supply	303,xlvi-xlvii
Market gardens, should night-soil be used as a fertilizer on	509
Marquette, average daily range of temperature at, by months, 1894, Table III	26
county, small-pox at, in 1894	406
extremes and range of temperature at, in 1894, Table II	22-23
fog at, in 1884, Exhibit 23	38-41
latitude, longitude and altitude of, in 1894, Exhibit 2	3
meteorological conditions at, in 1894, used in studying sickness, Exhibit VIII	113
meteorological phenomena at, in 1894	13-15
rainfall at, in 1894, Table VII, Diagram VII	48-49
sunny and cloudy days at, by months, in 1894	75-76
typhoid fever at, correspondence and diagram	301-303
velocity of wind at, miles per hour, by months, 1893, Table XI, Diagram XI	58-59
Marshall, latitude, longitude and altitude of, in 1894, Exhibit 2	3
measles at, restricted	360
Martin, Dr. Frank W., report from, relative to outbreak of scarlet fever at Westphalia township, Clinton Co.	254
Marvill, Lewis, meteorological observer at Parkville, in 1894	2
Mayville, escape of suspected case of small-pox from Milwaukee, Wis., to, in 1894	415
school-house at, alleged to be a nuisance	497
McBain, Missaukee Co., typhoid fever at, Diagram of locality, etc.	303-304
McBurney, M. D., W., correspondence with, and map from, relative to typhoid fever at Duncan township	299-300
McColl, Dr. D. J., letter from, relative to diphtheria in Huron Co.	205
Measles, age of greatest prevalence, and mortality from	363-373
and whooping-cough and meteorological conditions, by months, in 1894, Exhibit XXIII.	141
average duration of fatal and non-fatal cases of	371-373
average numbers of cases and deaths per outbreak, isolation and disinfection enforced, neglected, doubtful, etc., Table 9	364
by sex and age-groups, number of deaths and per cent deaths in each age-group were of deaths at all ages, Table 17	370
by sex and age-groups, per cent of fatal cases, and average age of decedents, 1893-94, Table 16	369
by sex and age-groups, the per cent of non-fatal cases during 1893-94, average age and number of cases, Table 15	396
by sex, duration in days of fatal cases, 1893-94, Table 18	371
by sex, duration in days of non-fatal cases of, 1893-94, Table 19	372
carried from Grand Rapids to Hastings, Barry Co., correspondence relative to	351-352
cases and deaths from, per 10,000 persons living, by counties, in 1894, Table 1, Map	333-338
cases and deaths in age-groups, per cent cases and deaths in each age-group were of all cases and deaths, Table 13	368
cases and deaths per outbreak, isolation and disinfection doubtful, neglected and enforced, and cases and lives saved, Table 10	365
cases and lives saved from, by isolation and disinfection	362-363

Page

Measles, cases of, traced to former cases, localities, names of reporters and quotations from reports ... 338
causing in Michigan, in 1894, less sickness than the average of diseases, Exhibit VI ... 115
causing more or less sickness than the average of diseases, by State Divisions, Exhibit VII ... 116-117
contagium of, from outside the State, names of localities where from, and to carried, names of reporters and quotations from reports ... 330
Detroit board of health decide to placard and restrict ... 361
distribution of, in Michigan, in 1894 ... 331-373
first, second and third localities, second infected from first and third from second, names of localities and numbers of cases and deaths, Table 8 ... 340-346
fumigation prevented at Imlay City village, Lapeer Co. ... 355-356
in age-groups in 1892-94, per cent cases and deaths in each age-group were of all cases and deaths, Table 14 ... 369
in Michigan, in 1894 ... 331-373
isolation and disinfection of, enforced, results ... 360-362
isolation and disinfection restricted, in 1894, Diagram ... 366
in 1894, compared with 1893, and with averages for 17 years, 1877-93, and for 8 years, 1886-93, Exhibit XX ... 127
movement of infection from outside the State, names of places where from, and to carried, names of reporters and quotations from reports ... 350
movements of contagium of, in Michigan, in 1894, Map ... 338-350
neglect of measures to restrict, violation of public-health laws ... 350-360
number and per cent of cases present, in each month of 1894, Table 6 ... 337
number of outbreaks, which began, ended and were present in each month of 1894, Table 5 ... 336
numbers of cases and deaths per outbreak, where isolation and disinfection were neglected, and where enforced, in 5 years, 1890-94, Table 2 and Diagram ... 154-155
order of prevalence of, for each of years, 1882-94, and average for 1882-93, Exhibit A ... 112
outbreaks, localities, cases and deaths from, cases and deaths per outbreak, and per cent of fatal cases, for 5 years, 1890-94, 1894 compared with 1893, and period of years, Table 3 ... 335
outbreaks of, reports relative to during third quarter of 1894, Table I ... xlii
last quarter of 1894, Table I ... xlix
first quarter of 1895, Table I ... lvii
second quarter of 1895, Table I ... lxvi
year 1894, Table II ... li
traced to other jurisdictions, names of places where from, and to carried, names of reporters, quotations from reports ... 346-350
per 10,000 population, by tiers of counties, in Michigan, in 1894, Table 2 ... 334
per cent of observers reporting presence of, for each of several years, and in two periods of years, and by months, in years, 1892-94, and two periods of years, Table 1 ... 97-99
per cent of observers of, weeks present, per cent and weekly reports, and average order of prevalence of, in State and Divisions of State, Table 3 ... 100-109
per cent of reports stating presence of, by months, in 1894, and averages for periods of years, Exhibit II ... 88
per cent of reports stating presence of, by years, 1882-94, and average for periods of years; also by months for 1892-94, and for periods of years, Exhibit IV ... 91-93
period of incubation by days, and average period of incubation, in 1894, Table 13 ... 367
period of incubation, in days, in 50 cases of, in 1894, Table 11 ... 367
presence of, per cent of observers reporting presence of, and average order of prevalence, Table 20 ... 373
prevalence of, in 1894, as regards time and area, by Divisions, Table 4 ... 110-111
proportion of, in different months of 1894 ... 372-373
reported deaths from, in Michigan, 25 years, 1869-93, Diagram 1 ... 336
reported deaths from, per 100,000 inhabitants, in each of the 27 years, 1868-94 ... 336
request for information relative to restriction of ... 358
restriction of ... 153

Page

Measles, rise and fall of, by months, in 1894 127
saving of lives and cases by isolation and disinfection of, in each of 5 years, 1890-94, Table 4 161
source of contagium of cases of, in Michigan, in 1894, Table 7 337-350
spread by roving Indians in Cedar township, Mackinac Co 356-357
summary of relations of, to climatic conditions, Exhibit XXVI 144
ways by which spread, neglect, names of localities, reporters and quotations from reports 359-360
Medical attendance on indigent sick with a dangerous communicable disease, a charge on the county liv-lv, 309-310
Medical practitioners, return of names of lxxiv
Medicine, is fitting glasses a branch of practice of lxii-lxiii
Meeting, regular of the State Board of Health, Lansing, July 13, 1894 xiii-xviii
Jan. 11, 1895 xxii-xxvi
regular quarterly and annual, of State Board of Health, Lansing, April 12, 1895 xxxii-xl
of State Board of Health, Lansing, October 12, 1894 xviii-xxi
special, of the State Board of Health at Charlotte, Nov. 22, 1894 xxi-xxii
Lansing, February 1, 1895 xxvi-xxx
Lansing, March 13, 1895 xxx-xxxii
Lansing, May 17, 1895 xli
Meetings, abstracts of proceedings of lxxix-lxxx
regular and special, of the State Board of Health, for year ending June 30, 1895 xiii-xli
Members of State Board of Health x
Memphis, Macomb Co., body dead from diphtheria shipped to, from Pt. Huron 213-218
Menestrina, M. D., J. F., correspondence with, relative to typhoid fever at Iron Mountain 298-299
Menominee, lump-jaw at, correspondence relative to, names of reporters, etc. 471-472
small-pox at, in 1894 403
Meridian township, Ingham Co., neglected outbreak of measles at, correspondence, etc. 352-353
Metamora township, Lapeer Co., removal of dead body to, from Detroit, without proper precautions, correspondence, etc. 450-451
Meteorological characteristics of year 1894, in Michigan, and at one central station in Michigan .. 11-12
Meteorological conditions and average disease, by year and months, in 1894, Exhibit XXVIII 147
and bronchitis, by year and months, in 1894, Exhibit X 123
and cholera morbus and dysentery, by months, in 1894, Exhibit XXIV .. 142
and consumption and pleuritis, by months, in 1894, Exhibit XVII 131
and diarrhea and cholera infantum, by months, in 1894, Exhibit XIX ... 136
and influenza and scarlet fever, by months, in 1894, Exhibit XV 129
and intermittent and remittent fever, by months, in 1894, Exhibit XXI. 139
and measles and whooping-cough, by months, in 1894, Exhibit XXIII .. 141
and pneumonia and membranous croup, by months, in 1894, Exhibit XII. 124
and rheumatism and neuralgia, by months, in 1894, Exhibit XVI 130
and tonsilitis and diphtheria, by months, in 1894, Exhibit XIV 128
and typhoid and typho-malarial fever, by months, in 1894, Exhibit XXII 140
by year and months, in 1894, compared with averages for 1893, and for periods of years, at Agricultural College, Exhibit 7 9-10
by year and months, in 1894, compared with averages for 1893, and periods of years, at groups of stations, Exhibit 6 7-8
in Michigan, in 1894 1-80
in Michigan, in 1894, compared with preceding years, Exhibit IX 119
relations of bronchitis to 120-121
relations of cholera infantum and "warm weather" diseases to 135
relations of diarrhea to 134-135
relations of pneumonia and "cold weather" diseases to 121-122
relations of the total amount of sickness to 145-147
data and sickness statistics, in reply to charges by Rep. Miller and by Gongwer cxxi-cxxv
instruments, change of exposure of, at Lansing 15

Page

Meteorological observations, where made, in Michigan, for use in the study of causation of diseases, Exhibit VIII 118
observers (see observers).
phenomena, local, in the several months of 1894 13-15
reports for the year 1894 lxxiv
stations, latitude, longitude, elevation, average temperature and atmospheric pressure at, in Michigan, in 1894 4
Meteorology at central station and sickness in Michigan from all causes, third quarter of 1894, compared with preceding quarter xlviii
last quarter of 1894, compared with preceding quarter lvi
first quarter of 1895, compared with preceding quarter lxiv-lxv
second quarter of 1895, compared with preceding quarter lxx-lxxi
work on, during third quarter of 1894 xliii
last quarter of 1894 lii-liii
first quarter of 1895 lx-lxi
second quarter of 1895 lxvii-lxviii
Michigan health officers, proceedings of second annual conference of, printing of xlv
plan for the restriction of consumption liv
School for the Blind, bad system of ventilating and heating at lxxx-lxxxiii
State Medical Society, special consideration given to consumption at, subjects of papers, by whom read, etc. 433
Miller Bill, final action on cxxix
hearing on cx-cxxviii
House Bill, File No. 121, relative to cxiii-cxvii
objections to cxxvi-cxxviii
Miller, Hon. P. D., reply by Dr. Baker to charges by cxvii-cxxvi
Secretary Baker's reply to interview with cviii-cx
Milwaukee, Wis., escape of suspected case of small-pox from, to Mayville, Michigan 415
Minnesota, small-pox situation at, in 1894 415
Mitchell, M. D., D. W., meteorological observer at Harrisville, in 1894 2
Money value saved by isolation and disinfection 150
Monroe, neglected outbreak of measles at, and resolutions of board of health 357-358
removal of corpse to, from Toledo, O., in 1894 449-450
Morse, Grant M., correspondence with, relative to neglected outbreak of diphtheria at Portland, Ionia Co. 202
Mortality statistics, lives saved by public-health work, not all shown by 167
relative to lives saved by public-health work 164
resolution relative to prompt registration of xxiii
Mosher, Stephen A., correspondence with, relative to diphtheria in Huron Co. 204-205
Mottville township, St. Joseph Co., advice asked relative to nuisance at 491
Mt. Pleasant city, Isabella Co., neglect to isolate mild cases of scarlet fever at 258
Mudge, M. D., D. W., reports from, relative to restricted measles at Chesaning township, Saginaw Co 361
Nadeau Township, Menominee Co., chicken-pox at, in 1894 418
Napoleon township, Jackson Co., chicken-pox at, first suspected as being small-pox 416-417
National conference of State Boards of Health at Washington xcvi-xcix
Negaunee, alleged nuisance at, correspondence, name of reporter, etc. 493
Neuralgia and rheumatism and meteorological conditions, by months, in 1894, Exhibit XVI 130
by year and months, in 1894, compared with 1893, and with averages for 15 years, 1879-93, and for 8 years, 1886-93, Exhibit XIII 126
causing, in Michigan, in 1894, more sickness than the average of diseases, Exhibit VI 115

Page

Neuralgia causing more sickness than the average of diseases in 1894, by State Divisions, Exhibit VII 116-117
order of prevalence of, for each of years, 1882-94, and average for 1882-93, Exhibit A 112
per cent of observers of, weeks present, per cent and weekly reports of, and average order of prevalence of, in State and Divisions of State, Table 2 100-109
per cent of observers reporting presence of, for each of several years, and in two periods of years, and by months, in years, 1893-94, and two periods of year, Table 1 97-99
per cent of reports stating presence of, by months, in 1894, and averages for periods of years, Exhibit II 88
per cent of reports stating presence of, by years, 1882-94, and average for periods of years; also, by months, for 1893-94, and for periods of years, Exhibit IV 91-93
prevalence of, in 1894, as regards time and area, by Divisons, Table 4 110-111
rise and fall of, by months, in 1894 127
summary of relations of, to climatic conditions, Exhibit XXV 143
Night-soil a nuisance at Colon township, St. Joseph Co. 509
should not be used as a fertilizer for market garden 509
Novy, M. D., F. G., report of International Congress of Hygiene at Buda-Pesth by xci-civ
Nuisance, advice asked, relative to suspected, at Colon township, St. Joseph Co. 491
cemeteries at Hamtramck township, Wayne Co., an alleged 513-515
how far a slaughter-house must be from highway 498
extent of local jurisdiction in cases of, by State Board of Health 515
Nuisances, alleged in Michigan, in 1894 488-515
hog-pens and barn-yards considered as, correspondence, names of reporters, etc. 507-508
slaughter-houses and their surroundings alleged to be 497-500
Observers, meteorological, compilation of reports of, for 1894 1-80
*names of and localities represented, whose weekly reports of diseases are compiled in Tables 1, 2, 3 and 4, Exhibit V 94-98

*It has been customary to place in the index the name of each observer, and the location represented, but on account of the great number, this has been omitted, and reference is made in the index only to "Exhibit V," and to "Observers."

number per month, reporting from each Division, in 1894, Exhibit III 90
per cent of, reporting each of 28 diseases for each of the years, 1882-94, average for 1877-93, and for seven years, 1886-93, Table 1 97
per cent of, reporting the several diseases, by months, for 1893-94, and average, by months, for 1886-93 and 1877-93, Table 1 (Con.) 98-99
Office, private, of Secretary, re-arrangement of lv
Oil, kerosene, tests of 477-479
Onondaga township, Ingham Co., lump-jaw at, correspondence relative to, names of reporters, etc. 470
Osceola township, Livingston Co., woman fatally burned by kerosene at, correspondence, etc. 481
Otisco township, Ionia Co., outbreaks of scarlet fever at 253
removal of dead body from, in 1894, correspondence, etc. 447-448
Otsego, Allegan Co., small-pox at, in 1894 399-402
Outbreak, definition of the term 153-176
Oven, M. D., A. G., report from, relative to restricted outbreak of measles at Petoskey 360-361
Overwork, typhoid fever attributed to, localities, names of reporters and quotations from reports 306
Ovid, Clinton Co., suspected hydrophobia at, correspondence relative to 456
Owosso, sewer at, an alleged nuisance 500-501
Ozone, day, by months, in 1894, at each of 16, and average lines at 9, and at 4 stations in Michigan, Table VIII 50
in 1894, at each of 7 and average line at 9 stations in Michigan 51
in 1894, compared with 1893, and with average for 17 years, 1877-93, at stations in Michigan, Exhibit 30 54
night, by months, in 1894, at each of 16, and average for 9, and for 4 stations in Michigan, Table IX 52
in 1894, at each of 7 and average line for 9 stations in Michigan 53
in 1894, compared with 1893, and with averages for 17 years, 1877-93, at stations in Michigan, Exhibit 31 54

Page

Ozone, observations for, at Lansing 55
Palmer, M. D., E. N., letters from, relative to prosecution for disobedience of public-health laws 354
Palmyra township, Lenawee Co., woman severely burned at, by kerosene, correspondence, etc. 482
Pamphlets, leaflets and diagrams, printing and publishing lxxv-lxxviii
Paper, amount and kind on hand, June 30, 1895 cxlviii
Parkville, fog at, in 1894, Exhibit 23 28-41
meteorological phenomena at, in 1894 12-15
rainfall at, in 1894, Table VII, Diagram VII 48-49
Parma village, an alleged nuisance at 508-509
Patrick, H. R., Observer, U. S. Weather Bureau, Marquette, meteorological reports from, in 1894 3
Payne, Dr. L. C., letter from, relative to diphtheria supposed to come from a cat 211-212
Peach-yellows alleged to be the cause of typhoid fever 307-309
Personal injuries consequent on the use of kerosene 480-484
Petition for inspection of diphtheria at Huron Co. 205
Petoskey, insufficiently buried fish at, an alleged nuisance 512-513
restricted outbreak of measles at 360-361
Physicians, relative to disagreement with health officer as to restriction of diseases 260-261
Pinckney village, Livingston Co., woman severely burned by kerosene at, correspondence, etc. 482
Plainfield township, Kent Co., outbreak of scarlet fever at 257
Pleuritis and consumption and meteorological conditions, by months, in 1894, Exhibit XVII 131
causing less sickness than the average of diseases in 1894, by State Divisions, Exhibit VII 116-117
order of prevalence of, for each of years, 1882-94, and average for 1882-93, Exhibit A 112
per cent of observers of, weeks present, per cent and weekly reports of, and average order of prevalence of, in State and Divisions of State, Table 2 100-109
per cent of observers reporting presence of, for each of several years, and in two periods of years, and by months, in years, 1893-94, and two periods of years, Table 1 97-99
per cent of reports stating presence of, by months, in 1894, and averages for periods of years, Exhibit II 88
per cent of reports stating presence of, by years, 1882-94, and average for periods of years; also, by months, for 1893-94, and for periods of years, Exhibit IV 91-93
prevalence of, in 1894, as regards time and area, by Divisions, Table 4 110-111
rise and fall of, by months, in 1894, Diagram 4 133
summary of relations of, to climatic conditions, Exhibit XXV 143
Pneumonia and "cold weather" diseases, relations of, to meteorological conditions 121-123
and membranous croup, and meteorological conditions, by months, in 1894, Exhibit XII 124
by year and months, in 1894, compared with 1893, and with averages for 17 years, 1877-93, and for 8 years, 1886-93, Exhibit XIII 126
causing less sickness than the average of diseases in 1894, by State Divisions, Exhibit VII 116-117
order of prevalence of, for each of years, 1882-94, and average for 1882-93, Exhibit A 112
per cent of observers of, weeks present, per cent and weekly reports of, and average order of prevalence of, in State and Divisions of State, Table 8 100-109
per cent of observers reporting presence of, for each of several years, and in two periods of years, and by months, in years, 1893-94, and two periods of years, Table 1 97-99
per cent of reports stating presence of, by months, in 1894, and averages for periods of years, Exhibit II, Diagram I 88-89
per cent of reports stating presence of, by years, 1882-94, and average for periods of years; also by months, for 1893-94, and for periods of years, Exhibit IV 91-93
prevalence of, in 1894, as regards time and area, by Divisions, Table 4 110-111
summary of relations of, to climatic conditions, Exhibit XXV 143
Poisoning from dried beef, in Michigan, in 1894 453-454
from lead, in Michigan, in 1894 452-453
suspected, from pressed chickens, at Sturgis, in 1894 454
Pompei village, Gratiot Co., slops from butter factory, an alleged nuisance 513
Pontiac, hog cholera at, in 1894, correspondence, names of reporters 468-469
Pontiac township, Oakland Co., hydrophobia at, correspondence relative to 458-459

Page

Poor persons having a dangerous communicable disease a charge on the county, opinion of attorney general clv
Portland, diphtheria at, during third quarter of 1894 xlvi
neglected outbreak of diphtheria at, correspondence relative to 201-208
Portland township, Ionia Co., diphtheria at, law relative to public-health 213-214
Port Huron, average daily range of temperature at, by months, in 1894, Table III 26
body dead from diphtheria, shipped from, to Memphis, Michigan 213-213
extremes and range of temperature at, in 1894, Table II 22-23
fog at, in 1894, Exhibit 23 38-41
latitude, longitude and altitude of, in 1894, Exhibit 2 3
meteorological conditions at, in 1894, used in studying sickness, Exhibit VIII 113
meteorological phenomena at, in 1894 12-15
ozone, day, at, in 1894, Table VIII 50
ozone, night, at, in 1894, Table IX 53
rainfall at, in 1894, Table VII 48
sunny and cloudy days at, by months, in 1894 77
velocity of wind at, miles per hour, by months, 1894, Table XI, Diagram XI 58-59
Postage, vouchers for, during year ending June 30, 1895 cxlviii
Postal-card, blank report 88
Potterville, kerosene casualty at, in 1894 480
President's address to State Board of Health xxxv-xxxviii
Privies, etc., alleged nuisances 500-507
Proof-reading, editing and compiling (see compiling).
Property, loss of, caused by use of gasoline, in 1894 485-487
report of Secretary for year ending June 30, 1895 cxxxvii-cxxxix
Prosecution for disobedience of public-health laws 354
Public buildings, examination of plans for xiii
Public-Health Committee, hearing on Miller Bill before cx-cxxviii
laws, prosecution for disobedience of 354
laws, transgression of, diphtheria, how spread 198
laws, violation of, neglect to restrict measles 350-360
laws, violation of, neglect to restrict scarlet fever 258-262
legislation in Michigan, in 1895 lxx, c-civ
legislation, *not* asked for by the State Board of Health cii-civ
legislation, titles of bills proposed by State Board of Health xxvi-xxviii
questions of law, relating to 213-214
work, lives saved by, not all shown by communicable disease statistics 162
work, lives saved by, not all shown by mortality statistics 157
work, mortality statistics relative to lives saved by 164
Publications by State Board of Health relative to consumption, requests for 432-433
distribution of, during third quarter of 1894 xliii-xliv
last quarter of 1894 lii
first quarter of 1895 lxi-lxii
last quarter of 1895 lxix-lxx
Puerperal fever, in Michigan, in 1894 375
order of prevalence of, for each of years, 1882-94, and average for 1882-93, Exhibit A 112
per cent of observers of, weeks present, per cent and weekly reports of, and average order of prevalence of, in State and Divisions of State, Table 2 100-109
per cent of observers reporting presence of, for each of several years, and in two periods of years, and by months, in years, 1893-94, and two periods of years, Table 1 97-99
per cent of reports stating presence of, by months, in 1894, and averages for periods of years, Exhibit II 88
per cent of reports stating presence of, by years, 1882-94, and average for periods of years; also, by months, for 1893-94, and for periods of years, Exhibit IV 91-93
prevalence of, in 1894, as regards time and area, by Divisions, Table 4 110-111
rise and fall of, by months, in 1894 127

Page

Pullen, M. D., C. D., correspondence with, relative to diphtheria supposed to be from a cat 211-212
report relative to spread of scarlet fever through neglect of mild case 258
Quarantine law, the State, relative to lxxxvi-xci
national system, a plea for an efficient xcvii-xcix
rules of State Board of Health relative to, etc. lxxxvi-lxxxvii
Quarterly reports of work in the office of State Board of Health xli-lxxi
Rabies, (see hydrophobia) in Michigan, in 1894 456-464
paper on, by T. R. MacClure, ordered reprinted xxx
Rags, old, outbreaks of diphtheria attributed to infection from, localities, names of reporters and quotations from report 196-197
Railway employés, vaccination of a large number of, results 412-414
Rainfall, average by year and months, 1894, at each of 19, and average for 16 stations in Michigan, Table VII 48
average by year and months in 1894, compared with 1893, and with averages for 17 years, 1877-93, at stations in Michigan, Exhibit 28 46
average number of inches, by months, for each of 10 years, 1885-94, average for 10 years, 1878-87, and for 8 years, 1886-93, Table 20 326
by months in 1894, at each of 8 and average line for 16 stations in Michigan, Diagram VII 49
by year and months, 1894, compared with 1893, and with averages for 30 years, 1864-93, at Agr'l College, Exhibit 29 47
total annual, sickness from typhoid fever, and depth of ground-water in well at Lansing, compared, Table 28 330
Ramsdell, Dr. J. L., letter from, relative to diphtheria 195
Redding township, Clare Co., alleged nuisance at 492
Remittent fever and intermittent fever and meteorological conditions, by months, in 1894, Exhibit XXI 139
and meteorological conditions, by months, in 1894, Exhibit XII xii
causing in Michigan, in 1894, less sickness than the average of diseases, Exhibit VI 115
causing more or less sickness than the average of diseases in 1894, by State Divisions, Exhibit VII 116-117
in 1894, compared with 1893, and with averages for 17 years, 1877-93, and for 8 years, 1886-93, Exhibit XX 137
order of prevalence of, for each of years, 1882-94, and average for 1882-93, Exhibit A 112
per cent of observers of, weeks present, per cent and weekly reports of, and average order of prevalence of, in State and Divisions of State, Table 2 100-109
per cent of observers reporting presence of, for each of several years, and in two periods of years, and by months, in years, 1893-94, and two periods of years, Table 1 97-99
per cent of reports stating presence of, by months, in 1894, and averages for periods of years, Exhibit II 88
per cent of reports stating presence of, by years, 1882-94, and average for periods of years; also, by months, for 1893-94, and for periods of years, Exhibit IV 91-93
prevalence of, in 1894, as regards time and area, by Divisions, Table 4 110-111
rise and fall of, by months, in 1894, Diagram 5 138
summary of relations of, to climatic conditions, Exhibit XXVI 144
Removal, etc., of dead bodies, in Michigan, in 1894 447-451
Report, general, of work in office of the State Board of Health, during year ending June 30, 1895 lxxi-lxxx
minority of committee to investigate the State Board of Health cxxxvii
secretary's annual, printing and distribution of lxxv
of property on hand June 30, 1895 cxxxvii-cxxxix
of work done in third quarter of 1894 xli-xlviii
last quarter of 1894 xlviii-lvii
first quarter of 1895 lvii-lxv
second quarter of 1895 lxv-lxxi

	Page
Reports, annual compilation of the weekly	84-85
annual, from health officers and clerks, for 1894	lx
card, number received, number of diseases on each report, in 1884-94, Exhibit B	113
card, plan of the weekly	82-83
of sickness, physicians'	83
per cent of, stating the presence of 28 diseases for each year, 1882-94, and average for 17 years, 1877-93, and 8 years, 1886-93	91-93
quarterly and health bulletins	lxxviii-lxxix
secretary's quarterly of work in office	lxi-lxxi, lxxx
weekly, number received from each Division of State, by months, 1894, Exhibit III	90
number received from each observer in 1894, and compiled in Tables 1, 2, 3 and 4, Exhibit V	94-96
of diseases, by year and months and summary relative to, in Michigan, in 1894, and by State Divisions for two periods, Table 2	100-109
of sickness in Michigan, by months, in 1894, Diagram 5	138
of sickness in Michigan, in 1894	81-148
of sickness in Michigan, in 1894, Diagram 1	89
of sickness in Michigan, in 1894, Diagram 2	125
of sickness in Michigan, in 1894	127
of sickness in Michigan, in 1894, Diagram 4	133
per cent of, stating presence, and order of prevalence of diseases in each geographical Division of State, Exhibit VII	116-117
Reprints	lxxx
Resolutions for State Hospital for Consumptives, by Conference of Health Officers	436
Rheumatism and neuralgia and meteorological conditions, by months, in 1894, Exhibit XVI	130
by year and months, in 1894, compared with 1893, and with averages for 17 years, 1877-93, and for 8 years, 1886-93, Exhibit XIII	126
causing in Michigan, in 1894, more sickness than the average of diseases, Exhibit VI	115
causing more sickness than the average of diseases in 1894, by State Divisions, Exhibit VII	116-117
order of prevalence of, for each of years, 1882-94, and average for 1882-93, Exhibit A	112
per cent of observers of, weeks present, per cent and weekly reports of, and average order of prevalence of, in State and Divisions of State, Table 2	100-109
per cent of observers reporting presence of, for each of several years, and in two periods of years, and by months, in years, 1893-94, and two periods of years, Table 1	97-99
per cent of reports stating presence of, by months, in 1894, and averages for periods of years, Exhibit II	88
per cent of reports stating presence of, by years, 1882-94, and average for periods of years; also, by months, for 1893-94, and for periods of years, Exhibit IV	91-93
prevalence of, in 1894, as regards time and area, by Divisions, Table 4	110-111
rise and fall of, by months, in 1894	127
summary of relations of, to climatic conditions, Exhibit XXV	143
the causation and prevention of, discussion as to	xiii-xiv
Rich township, Lapeer Co., glanders (in a horse) at, correspondence relative to	465
Richmond village, a hog pen at, an alleged nuisance	506
Riecke, M. D., J. W., correspondence with, relative to unsanitary conditions and typhoid fever in Walker township, Kent Co.	305
Riley township, St. Clair Co., typhoid fever at	306
River Raisin, depth of well, of ground above water in well, temperature of water at, by months, in 1894, Exhibit 8	16-17
Rockland, absolute humidity at, by months, in 1894, Table IV	33
atmospheric pressure at, by months, in 1894, Table XVII, Diagram XVI	72-73
average daily range of atmospheric pressure at, by months, in 1894, Table XV	69
average daily range of temperature at, by months, in 1894, Table III	26
average temperature at, by year and months, for 1894, Table 1, Diagram 1	20-21
cloudiness at, in 1894, Table VI	43
elevation, average temperature and atmospheric pressure at, in 1894, Exhibit 2	8
extremes and range of temperature at, in 1894, Table II	22-23

	Page
Rockland, fog at, in 1894, Exhibit 23	33-41
lump-jaw at, correspondence relative to, names of reporters, etc.	472
meteorological conditions at, in 1894, used in studying sickness, Exhibit VIII	113
meteorological phenomena at, in 1894	14
ozone, day, at, in 1894, Table VIII, Diagram VIII	50-51
ozone, night, at, in 1894, Table IX, Diagram IX	52-53
rainfall at, in 1894, Table VII	48
range of atmospheric pressure at, by months, in 1894, Table XVI	70
relative humidity at, by months in 1894, Table V	34
sunny and cloudy days at, by months, in 1894	75
wind at, direction, months in 1894, Table XIII, Diagram XV, Diagram XII, Table XIV	62-68
Rome township, Lenawee Co., outbreak of scarlet fever at	254
Ross, M. D., E. J., report relative to outbreak of scarlet fever at Rome Township, Lenawee Co.	254
Rötheln, numbers of cases, deaths, localities, instances, names of reporters, where from, in Michigan, in 1894	274-275
Royal Oak, consumption at, restricted	490
Royal Oak township, Oakland Co., small-pox at, in 1894	395-396
Saginaw, E. S., an alleged nuisance at, a privy, correspondence relative to, names of reporters, etc.	502-507
W. S., hydrophobia at, correspondence, etc.	460
Salem township, Allegan Co., typhoid fever at, alleged to be caused by peach-yellows	307-309
Sanitary conventions	xi-xii
inspections of various localities	xlvi
periodical, reply, relative to charges concerning	cxxv
Saranac, Ionia Co., neglected outbreak of measles at	353-354
Sault Ste. Marie, average daily range of temperature at, by months, in 1894, Table III	26
extremes and range of temperature at, in 1894, Table II	22-23
latitude, longitude and altitude of, in 1894, Exhibit 2	8
meteorological conditions at, in 1894, used in studying sickness, Exhibit VIII	113
meteorological phenomena at, in 1894	13-14
rainfall at, in 1894, Table VII	48
sunny and cloudy days at, by months, in 1894	76
velocity of wind at, miles per hour, by months, 1894, Table XI, Diagram XI	58-59
Scarlet fever, ages of prevalence, and greatest mortality from, Tables, etc.	269-273
and influenza and meteorological conditions by months, in 1894, Exhibit XV	129
at Holly, investigated by State	259-260
attributed to unsanitary conditions, locality, name of reporter and quotation from report	287
average duration of fatal and non-fatal cases of	273
by age-groups, the numbers of cases and deaths in each of years, 1892-94, per cent the cases and deaths in each age-group were of all cases and deaths, Table 14	270
by periods of years the annual rate of deaths and life-saving, Table 9	170
by sex, the duration in days of fatal cases of, in 1894, Table 17	273
by sex, the duration in days of non-fatal cases of, in 1894, Table 18	273
by tiers of counties, in Michigan in 1894, Table 2	232
by year and months, in 1894, compared with 1893, and with averages for 17 years, 1877-93, and for 8 years, 1886-93, Exhibit XIII	126
cases and deaths per 10,000 inhabitants, by counties, in 1894, Table 1	260
cases and lives saved by isolation and disinfection for each of, and average for years, 1887-94, Table 10	267
cases of, traced to a former case, locality, name of reporter and quotation from report	286
causing in Michigan, in 1894, less sickness than the average of diseases, Exhibit VI	115
causing more or less sickness than the average of diseases, in 1894, by State Divisions, Exhibit VII	116-117
comparison of deaths from, before and after its restriction by State Board of Health, Table 7 and Diagram	164-165

Page

Scarlet fever, comparison of lives saved, sickness prevented and money saved by public-health work in two periods of years ... 169
deaths and death-rates from, for 5 years before restriction of, was undertaken by State Board of Health, Table 5 ... 162
deaths and death-rates from, for 21 years, 1874-94, Table 6 ... 163
deaths from, per 100,000 inhabitants, for 24 years, 1868-91, Diagram 1 ... 171
death-rate from, per 100,000 inhabitants, 27 years, 1868-94, Table 4 ... 234
decreasing death-rate from, for the years 1869-94, Diagram 2 ... 171
distribution of, in Michigan, in 1894 ... 228-233
fatal cases by age-groups, in 1894, per cent deaths in each age-group were of all deaths, Table 15 ... 271
first, second and third localities, second infected from first and third from second, names of localities and numbers of cases and deaths, Table 8 ... 238-246
germ, vitality of, instances of, locality, and name of reporter ... 227
in each month of 1894 ... 234-235
in 1894, compared with previous years ... 232-233
in Michigan, in 1894 ... 228-273
increasing life-saving from, for years, 1869-94, Diagram 3 ... 172
is biniodide of mercury a preventive treatment of ... 261-262
isolation and disinfection restrict, in Michigan, in 1894, Diagram ... 266
isolation and disinfection restricted in Michigan, in 8 years, 1887-94, Diagram ... 157-158
lives and cases saved from, by isolation and disinfection ... 264
method of compiling, relative to ages, etc. ... 269
movements of contagium of, in Michigan, in 1894, Map ... 247
movements of the contagium of ... 237-238
neglect of measures to restrict, violation of the public-health laws ... 258-261
number and per cent of cases which were present in each month of 1894 ... 235
number of deaths, per 100,000 inhabitants, 24 years, 1868-91, Diagram 1 ... 234
number of outbreaks of, which began, ended and were present in each month of 1894 ... 234
number, per cent and average age of fatal and non-fatal cases of, by age-periods, in 1894, Table 16 ... 272
numbers of cases and deaths in certain age-groups, per cent cases and deaths in each age-group were of all cases and deaths, Table 13 ... 270
numbers of cases and deaths per outbreak, isolation and disinfection enforced, neglected, doubtful, etc., Table 9 ... 265
numbers of cases and deaths per outbreak, where isolation and disinfection were neglected, and where enforced, in 5 years, 1890-94, Table 2 and Diagram ... 154-155
numbers of outbreaks, localities, cases and deaths, by counties, in 1894, Map ... 231
numbers of outbreaks, localities, cases and deaths, cases and deaths per outbreak and ratio of deaths to cases for each of the years, 1882-94, and average for period of years, Table 3 ... 233
numbers of outbreaks, cases and deaths, and average cases and deaths per outbreak, isolation and disinfection enforced, and neglected, for 8 years, 1887-94, Table 3 ... 156
order of prevalence of, for each of years, 1882-94, and average for 1882-93, Exhibit A ... 112
outbreak of, at Bancroft ... 255
Bennington township, Shiawassee Co. ... 257-258
Detour township, Chippewa Co. ... 256-257
Frankfort village, Benzie Co. ... 255-256
Rome township, Lenawee Co. ... 254
Sturgis ... 254
Venice township, Shiawassee Co. ... 254
Westphalia township, Clinton Co. ... 254
outbreaks of, in Otisco township, Ionia Co. ... 253
in which isolation and disinfection were enforced, instances, localities and names of reporters ... 262-263
probably traced to former outbreaks ... 251-252
probably traced to outbreaks outside the State ... 252-253
reports relative to during third quarter of 1894, Table I ... xlii

Page

Scarlet fever, outbreaks of, reports relative to during last quarter of 1894, Table I xlix
first quarter of 1895, Table I lvii
second quarter of 1895, Table I lxvi
year 1894, Table II li
traced to outbreaks outside the State 251
per cent of observers of, weeks present, per cent and weekly reports of, and average order of prevalence of, in State and Divisions of State, Table 2 100-109
per cent of observers reporting presence of, for each of several years, and in two periods of years, and by months, in years, 1893-94, and two periods of years, Table 1 97-99
per cent of reports stating presence of, by months, in 1894, and averages for periods of years, Exhibit II 88
per cent of reports stating presence of, by years, 1882-94, and average for periods of years; also, by months, for 1893-94, and for periods of years, Exhibit IV 91-93
period of incubation, by days, in 208 cases of, Table 11 286
period of incubation in days, and average period of incubation, in 1894 269
prevalence of, in 1894, as regards time and area, by Divisions, Table 4 110-111
removal of body dead, from Detroit to Metamora, without proper precaution, correspondence, etc 450-451
reported source of contagium of cases of, in 1894, Table 7 225
restriction of 153
rise and fall of, by months, in 1894, Diagram 2 125
saving of lives and cases by isolation and disinfection of, in each of 5 years, 1890-94, Table 4 160
source and vitality of contagium of, how spread, etc 238-253
source of unknown, or reports indefinite, locality, name of reporter and quotation from report 236
spread by neglect of physicians to report promptly 253
spread through neglect of mild case 253
summary of, relations of, to climatic conditions, Exhibit XXV 143
traced to former case in another jurisdiction, places to and from which traced, names of reporters, and quotations from reports 246-252
Sebewa township, Ionia Co., small-pox at, in 1894 393-395
Second Annual Conference of Health Officers, consideration of consumption at, papers of, by whom read, etc 434-436
of Michigan Health Officers, printing of proceedings of xlv
Secretary of State Board of Health, official demand by, for special reports concerning consumption 431
re-arrangement of office of lv
Secretary's quarterly report of work in the office of State Board of Health xli-lxxi
Seney township, Schoolcraft Co., accumulated filth at, an alleged nuisance 513
Sewerage, defective, outbreaks of typhoid fever attributed to, localities, names of reporters and quotations from reports 304
Sewers, etc., alleged nuisances 500
Sharpe, H. R., Pres. of Laingsburg village, correspondence with, relative to diphtheria 199-200
Shaver, M. D., C. W., report from, relative to spread of scarlet fever through neglect of physicians to report 253
Shickle, M. D., Chas. E., report from, relative to scarlet fever in Bennington township, Shiawassee Co 257-258
request for information relative to restriction of measles from 359
Shoemaker, Dr. J. S., letter from, relative to diphtheria 196
Shulte, M. D., Joseph, letter from, relative to Detroit health board placarding and restricting measles 361
Sickness and climate, in Michigan, in 1894 120
diseases from which there seems to have been the most, in Michigan, in 1894, Exhibit VI. 115
diseases which appear to have caused most, in various years 113-114
from average disease, by year and months, in each of 18 years, 1877-94, and in two periods of years compared with 1894, Exhibit XXVII 146
from consumption, by year and months, for 1878-94, and in 1894 compared with averages for two periods of years, Exhibit XVIII 132

Page

Sickness in Michigan from all causes and meteorology (see meteorology).
physician's weekly reports of ... 82
prevented, lives and money value saved by isolation and disinfection ... 159
relation of the total amount of, to meteorological conditions ... 147
statistics ... 81-148
portion of reply to charges by Rep. Miller, and by Gongwer ... cxi-cxxv
weekly postal-card reports, 1894-95 ... lxxiii
work in connection with, during third quarter of 1894 ... xlvii
last quarter of 1894 ... lv-lvi
first quarter of 1895 ... lxiv
second quarter of 1895 ... lxx
statistical report based on study of, in 1894 and preceding years ... 81-148
the 15 diseases which caused the most, in the State and in the 11 geographical Divisions, in 1894, Exhibit VII ... 116-117
the total amount, relation of, to meteorological conditions ... 145-146
total, and average disease, explanation relative to ... 145
weekly reports of, by months, in Michigan in 1894, Diagram 5 ... 138
in Michigan, in 1894, and rise and fall of the average for the 28 diseases, Diagram 4 ... 128
in Michigan, in 1894, Diagram 3 ... 127
in Michigan, in 1894, Diagram 1 ... 89
in Michigan, in 1894, Diagram 2 ... 125
Slaughter-house, how far must be from highway ... 496
Small-pox, age of greatest prevalence, and mortality from ... 391
and consumption, in last quarter of 1894, reports from all sources, and newspaper reports affirmed or denied ... xlix
and consumption, reported from all sources, and from newspapers, during third quarter of 1894 ... xlii
at Crystal Falls, Iron Co., in 1894 ... 402-408
Danby township, Ionia county, in 1894 ... 395
Detroit, in 1894 ... 406-408
Kalamazoo Co., in 1894 ... 403-404
Manchester township, Washtenaw Co., in 1894 ... 396-399
Marquette Co., in 1894 ... 408
Menominee, in 1894 ... 408
Otsego, Allegan Co., in 1894 ... 399-402
Royal Oak township, Oakland Co., in 1894 ... 395-396
Sebewa township, Ionia Co., in 1894 ... 393-395
Sturgis, St. Joseph Co., in 1894 ... 396-398
Watson, Allegan Co., telegrams relative to, and investigation of ... lxiii-lxiv
average duration of fatal and non-fatal cases of, in 1894, Tables 12 and 13 ... 392
by periods of years, the annual rate of deaths and life saving, Table 9 ... 170
cases and deaths, per 10,000 inhabitants, by counties, in 1894, Table 1 ... 390
cases of, traced to preceding cases ... 384-385
causing more sickness than the average of diseases in 1894, by State Divisions, Exhibit VII ... 116-117
comparison of deaths from, before and after its restriction by State Board of Health, Table 7 and Diagram ... 164-165
comparison of lives saved from, sickness prevented and money saved by public health work, in two periods of years ... 168
deaths and death-rates from, for 5 years before organization of the S. B. of H., Table 5 ... 162
deaths and death-rates from, for 21 years, 1874-94, Table 6 ... 163
deaths from, 26 years, 1869-94, Diagram 4 ... 172
deaths from, per 10,000 population in each of 26 years, 1869-94, Table 4, Diagram 4 ... 383-383
decreasing death-rate from, for 26 years, 1869-94, Diagram 5 ... 173
distribution of, cases per 10,000 population, by tiers of counties, in Michigan, in 1894 ... 381
distribution of, in Michigan, in 1894 ... 379-381
first attack of, not a preventive of second attack ... 393

Page

Small-pox, first, second and third localities, second infected from first, and third from second, names of localities, places from and to which traced, Table 8 385-387
for 11 years, 1884-94, numbers of localities, cases and deaths, and ratio of deaths to cases, Table 3 382
in 1894, by age-groups, the cases and deaths from, per cent the cases and the deaths in each age-group were of all cases and deaths, Table 11 391
increasing life savings from, 26 years, 1869-94, Diagram 6 173
in Michigan, in 1894 379-415
in Michigan, in 1894, compared with previous years 383
in Michigan, during third quarter of 1894 xlii
last quarter of 1894 l
first quarter of 1895 lviii
second quarter of 1895 lxvi-lxvii
Inter-State, notification of 414
movement of, from outside the State, names of localities and reporters, and quotations from reports 389
movements of contagium of 385
number and per cent of cases of, sick in any part of months, 1894, Table 6 384
order of prevalence of, for each of years, 1883-94, and average for 1883-93, Exhibit A 113
outbreaks of, in each month of 1894 383-384
in Michigan, in 1894, by localities 393-408
reports relative to, during third quarter of 1894, Table I xlii
last quarter of 1894, Table I xlix
first quarter of 1895, Table I lvii
second quarter of 1895, Table I lxvi
year 1894, Table II li
traced to former cases outside the jurisdiction, names of localities and reporters, and quotations from reports 389
outbreaks which began, ended and were present in each month of 1894, Table 5 383
per cent of observers of, weeks present, per cent and weekly reports of, and average order of prevalence of, in State and Divisions of State, Table 2 100-109
per cent of observers reporting presence of, for each of several years, and in two periods of years, and by months, in years, 1893-94, and two periods of years, Table 1 97-99
per cent of reports stating presence of, by months, in 1894, and averages for periods of years, Exhibit II 88
per cent of reports stating presence of, by years, 1883-94, and average for periods of years; also, by months, for 1893-94, and for periods of years, Exhibit IV 91-93
period of incubation by days, in 1894, Table 9 390
period of incubation of, by days in 1894, average period of incubetion, Table 10 390
prevalence of, in 1894, as regards time and area, by Divisions, Table 4 110-111
prevention of, leaflet relative to, also vaccination 409-410
probable movement of infection of, places where from and to carried, names of reporters and quotations from reports 390
rise and fall of, by months, in 1894, Diagram 2 125
situation, the, at Minnesota 415
source of contagium of cases of, Table 7 384-390
spread from Ft. Howard, Wis., to Menominee 404-406
suspected case of, escaped from Milwaukee, Wisconsin, to Mayville, Michigan 415
vaccination after exposure to 412-413
Smith, M. D., Chester, correspondence with, relative to diphtheria at Portland township, Ionia Co., and law relative to public health 213-214
Solar Halos, observed in 1894, Exhibit 27 46-48
Sore throat, diphtheria contracted by kissing person with 213
outbreaks of diphtheria, traced to, localities, names of reporters and quotations from reports 194-195
South Lyon, slaughter-house at, an alleged nuisance 499
Springport, dead animals buried near a well an alleged nuisance at 498
Standing committees of State Board of Health x-xi

Page

State Board of Health, abstracts of proceedings of meetings of lxxix-lxxx
Committees, etc x-xi
expenditures of, for year 1894 cxlix
expenditures, total amount and classification of, for year ending June 30, 1895 cxlix
expenses of, for 1894 and for succeeding years cvi-cviii
extent of local jurisdiction of, in cases of nuisances 515
legislative investigation asked for by resolution, etc cxxix-cxxxv
members of x
official demand of Secretary of, for special reports regarding consumption 431
President's address xxxv-xxxviii
public-health legislation, *not* asked for by cii-civ
publications relative to consumption, requests for, in 1894 432-433
regular and special meetings of xlii-xli
report of committee to investigate cxxxv-cxxxvi
resolutions demanding investigation xxxiii
Secretary's quarterly reports of work in the office of xli-lxxi
titles of bills approved by ci-cii
work of, for the year ending June 30, 1895 xli-cxlix
State Boards of Health, National Conference of, at Washington xcvi-xcix
State eleven geographical divisions of, for convenience in sickness and death study, Exhibit I 87
Hospital for Consumptives, demand for 434
proposed bill for xxviii-xxx
resolutions for, at Second Annual Conference of Health Officers 436
House of Correction, typhoid fever at 300-301
institutions and public buildings, examination of plans for xiii
Medical Society, special attention given to consumption, subjects of papers, by whom read, etc 433
Quarantine law, relative to lxxxvi-xci
Steam disinfection, relative to xcix-c
St. Joseph, diphtheria at, traced to Cincinnati 199
St. Joseph city, foul water at, an alleged nuisance 500
Sturgis, outbreak of scarlet fever at 254
small-pox at, in 1894 296-298
suspected poisoning from pressed chicken, in 1894 454
Sunshine and clouds at stations in Michigan, in 1894 75-80
Supervisors should allow claims of medical attendance on indigents sick with a dangerous communicable disease 309-310
Swartwout, M. D., Geo. W., report from, relative to scarlet fever in Aurelius township, Ingham Co. 258
Table I, average temperature by year and months, 1894, at each of, and average for 11 stations in Michigan 21
II, extremes and range of temperature, by months, for 1894, at stations in Michigan 22-23
III, average daily range of temperature, by year and months, 1894, at each of, and average for 16 stations in Michigan 26
IV, absolute humidity at each of 12, and average line for 7 stations in Michigan, in 1894 32
V, relative humidity at each of 12 stations and average line for 7 stations in Michigan, in 1894 34
VI, average per cent of cloudiness, by months, at each of 12 and average for 9 stations in Michigan, in 1894 42
VII, rainfall by year and months, 1894, at each of 19, and average for 16 stations in Mich. 48
VIII, ozone, day, by months, in 1894, at each of 16, and average lines at 9 and at 4 stations in Michigan 50
IX, ozone, night, by months, in 1894, at each of 16, and average lines at 9, and at 4 stations in Michigan 52
X, average velocity of wind, each hour of day, for 1894, at State Board of Health Office, Lansing 56
XI, velocity of wind, miles per hour, by months, 1894, at each of and average for 8 stations in Michigan 59

Page

Table XII, wind, direction, by months, average for 10 stations in Michigan, in 1894 61
XIII, wind, direction of, by months, 1894, at each of and average for 10 stations 63
XIV, wind, direction of, by months, 1894, at each of 12 and average line at 10 stations in Michigan 65
XV, average daily range of atmospheric pressure, by months at each of 12 and average for 10 stations in Michigan 69
XVI, range of atmospheric pressure at, by months for 1894, at each of and average for 9 stations in Michigan 70
XVII, average atmospheric pressure, by months, in 1894, at 13, and average line for 10 stations in Michigan 72
1, diphtheria, cases and deaths, per 10,000 inhabitants, by counties, in 1894 177
2, diphtheria, distribution of, by tiers of counties 179
3, diphtheria, numbers of localities, outbreaks, cases and deaths from, and ratio of deaths to cases, for 13 years, 1882-94, 1894 compared with 1893, and with average for 1884-93 180
4, diphtheria, deaths from, per 100,000 inhabitants, for each of the 27 years, 1868-94 181
5, diphtheria, numbers of outbreaks which began, ended and were present in each month of 1894 181
6, diphtheria, number of cases present in each month of 1894 182
7, source of contagium of cases of diphtheria, in 1894 182
8, diphtheria, first, second and third localities, second infected from first and third from second, names of localities, numbers of cases and deaths 184-189
10, diphtheria, average numbers of cases and deaths per outbreak, isolation and disinfection enforced, neglected, etc. 217
11, diphtheria, numbers of cases and deaths from, prevented by isolation and disinfection in 1887-94, and period of years 218
12, diphtheria, period of incubation of, in days, in 110 instances 219
13, diphtheria, period of incubation of, in days, and average period of incubation 219
14, diphtheria in age-groups, numbers of cases and deaths, and per cent the cases and deaths in each age-group were of all cases and deaths 220
15, diphtheria in age-groups, cases and deaths in 3 years, 1892-94, per cent the cases and deaths in each age-group were of all the cases and deaths 221
16, diphtheria, by sex and age-groups, number of deaths in 1894, per cent deaths in each age-group were of deaths at all ages 222
17, diphtheria, by sex and age-groups, in 1894, the number of cases and per cent the cases in each age-group were of all cases 223
18, diphtheria, by sex and age-groups, per cent of deaths in each age-group, number of deaths, and average age at death for each of 3 years, 1892-94 223
19, by sex, the duration of fatal cases of diphtheria, in 1892-94 224
20, diphtheria, by sex, the duration of non-fatal cases of 224
showing localities, cases and deaths from diphtheria in Huron Co., and sources of infection for 1893-94 210
1, scarlet fever, cases and deaths per 10,000 inhabitants, by counties, in 1894 230
2, scarlet fever, by tiers of counties, in Michigan, in 1894 232
3, scarlet fever, numbers of outbreaks, localities, cases and deaths, cases and deaths per outbreak and ratio of deaths to cases for each of years, 1882-94, and average for period of years 233
4, scarlet fever, death-rate, from, per 100,000 inhabitants, 27 years, 1868-94 234
5, scarlet fever, number of outbreaks of, which began, ended and were present in each month of 1894 234
6, scarlet fever, number and per cent of cases present in each month of 1894 235
7, scarlet fever, reported source of contagium of cases of, in 1894 235
8, scarlet fever, first, second and third localities, second infected from first and third from second, names of localities and numbers of cases and deaths 238-246
9, scarlet fever, numbers of cases and deaths per outbreak, isolation and disinfection enforced, neglected, doubtful, etc. 265
10, scarlet fever, cases and lives saved by isolation and disinfection for each of, and average for years, 1887-94 267
11, scarlet fever, period of incubation, by days, in 1894 268

Page

Table 12, scarlet fever, period of incubation in days, and average period of incubation in 1894 265
13, scarlet fever, numbers of cases and deaths in certain age-groups, per cent cases and deaths in each age-group, were of all cases and deaths 270
14, scarlet fever, by age-groups, the numbers of cases and deaths, in each of years, 1892-94, per cent the cases and deaths in each age-group, were of all cases and deaths 270
15, scarlet fever, fatal cases by age-groups, in 1894, per cent deaths in each age-group, were of all deaths 271
16, scarlet fever, number, per cent and average age of fatal and non-fatal cases of, by age-groups, in 1894 272
17, scarlet fever, by sex, the duration in days of fatal cases of, in 1894 272
18, scarlet fever, by sex, the duration in days of non-fatal cases of, in 1894 273
1, typhoid fever, outbreaks, localities, cases and deaths, average cases and deaths per outbreak, and ratio of deaths to cases, 11 years, 1884-94 277
2, typhoid fever, reported deaths from, per 100,000 persons living, 27 years, 1868-94 278
3, typhoid fever, cases and deaths per 10,000 population, by tiers of counties, in 1894 279
4, typhoid fever, cases and deaths per 10,000 inhabitants, by counties, in Michigan, in 1894 280
5, typhoid fever, outbreaks which began, ended and were present in each month of 1894 284
6, typhoid fever, number and per cent of cases in each month of 1894 285
7, typhoid fever, first, second and third localities, second infected from first and third from second, names of localities, numbers of cases and deaths 287-292
8, typhoid fever, average number of cases and deaths per outbreak, isolation and disinfection enforced, neglected, doubtful, etc., 1894 312
9, typhoid fever, cases and lives saved from, in each of, and average for 5 years, 1890-94 314
10, typhoid fever, average duration in days, by sex, of fatal cases of typhoid fever, 8 years, 1887-94 315
11, typhoid fever, average duration by sex, of non-fatal cases of, 8 years, 1887-94 316
12, typhoid fever, by sex and age-groups, the per cent of persons sick from, during 8 years, 1887-94 317
13, typhoid fever, by sex and age-groups, the per cent of deaths from, and per cent the deaths in each age-group, were of all deaths 318
14, typhoid fever, by sex and age-groups, the number of deaths from, during 1892-94; also, average deaths per 10,000 inhabitants 318
15, typhoid fever, per cent of reports stating presence of, and outbreaks, localities, cases and deaths, for each of 10 years, 1885-94, and average for 8 years, 1886-93 321
16, typhoid fever, relation of low water in wells to, during 16 years, 1878, 1880-94 323
17, height of ground-water in the well at Lansing, by months, for each of the 10 years, 1885-94, and average for the 8 years, 1886-93 323
18, typhoid fever, per cent of cases reported, per cent of outbreaks which began, height of ground-water, by months, for each of 9 years, 1886-94 325
19, typhoid fever, average per cent of weekly card-reports stating the presence of, by months, for 10 years, 1885-94, average for 10 years, 1878-87, and for 8 years, 1886-93 326
20, rainfall, average number of inches, by months, for each of 10 years, 1885-94, average for 10 years, 1878-87, and for 8 years, 1886-93 326
21, temperature of water in well at Lansing, by months, for the 10 years, 1885-94, and averages for 8 years, 1886-93 327
22, typhoid fever, sickness from, height of ground-water, and temperature of water in well at Lansing, averages by months, 8 years, 1886-93 327
23, sickness from typhoid fever, average total annual rainfall, depth of ground-water in well at Lansing compared 330
1, measles, cases and deaths from, per 10,000 persons living, by counties, in 1894 333
2, measles, per 10,000 population, by tiers of counties, in Michigan, in 1894 334
3, measles, outbreaks, localities, cases and deaths from, cases and deaths per outbreak, and per cent of fatal cases, for 5 years, 1890-94, 1894 compared with 1893, and period of years 335
4, measles, reported deaths from, per 100,000 inhabitants, in each of the years, 1868-94 336
5, measles, number of outbreaks which began, ended and were present in each month of 1894 336
6, measles, number and per cent of cases present, in each month of 1894 337
7, source of contagium of cases of measles, in Michigan, in 1894 337

Page

Table 8, measles, first, second and third localities, second infected from first and third from second, names of localities, and numbers of cases and deaths 340-346
9, measles, average number of cases and deaths per outbreak, isolation and disinfection enforced, neglected, doubtful, etc. 364
10, measles, cases and deaths per outbreak, isolation and disinfection, doubtful, neglected and enforced, and cases and lives saved 365
11, measles, period of incubation, in days, in 50 cases of, in 1894 367
12, measles, period of incubation in days, and average period of incubation in 1894 367
13, measles, cases and deaths in age-groups, per cent cases and deaths in each age-group, were of all cases and deaths 368
14, measles, in age-groups in 1892-94, per cent cases and deaths in each age-group were of all cases and deaths 368
15, measles, by sex and age-groups, the per cent of non-fatal cases during 1893-94, average age and number of cases 369
16, measles by sex and age-groups, per cent of fatal cases and average age of decedents 1893-94 369
17, measles, by sex and age-groups, number of deaths, and per cent deaths in each age-group were of deaths at all ages 370
18, measles, by sex, duration in days of fatal cases, 1893-94 371
19, by sex, duration in days of non-fatal cases of measles, 1893-94 372
20, measles, presence of, per cent of observers who reported presence and average order of prevalence 373
1, small-pox, cases and deaths from, per 10,000 inhabitants, by counties, in 1894 380
2, small-pox, per 10,000 population, by tiers of counties, in Michigan, in 1894 381
3, small-pox, for 11 years, 1884-94, the numbers of localities, cases and deaths, and ratio of deaths to cases 382
4, small-pox, number of deaths from, per 10,000 population in each of 26 years, 1869-94 382
5, small-pox, outbreaks of, which began, ended and were present, in each month, 1894 383
6, small-pox, number and per cent of cases of, sick in any part of months, 1894 384
7, small-pox, source of contagium of cases of 384
8, small-pox, first, second and third localities, second infected from first and third from second, names of localities, places from and to which traced 385-387
9, period of incubation of small-pox, by days, in 1894 390
10, small-pox, period of incubation of by days in 1894, and average period of incubation 390
11, small-pox, in 1894, in age-groups the cases and deaths from, per cent the cases and the deaths in each age-group were of all cases and deaths 391
12, small-pox, by sex, the duration in days of fatal cases of 392
13, small-pox, by sex, the duration in days of non-fatal cases of 392
1, consumption, cases and deaths per 10,000 inhabitants, by counties, in 1894 421
2, consumption, by tiers of counties, in Michigan, in 1894 423
3, consumption, localities, cases and deaths, average of cases and deaths per locality, and ratio of deaths to cases, 1893-94 424
4, consumption, deaths from, per 100,000 inhabitants for each of years, 1869-94 425
5, consumption, number and per cent of cases reported taken sick, in each month for years, 1890-94 426
6, consumption, number of deaths from, in each month of 1894 427
7, source of contagium of consumption in 1894 427
8, consumption cases and deaths from, by age-groups, in 1894, and per cent the cases and the deaths in each age-group were of all cases and deaths 440
9, consumption, by sex and age-groups, the fatal cases of 440
10, consumption, by sex and age-groups, the per cent of fatal cases of, and average age at death 441
11, consumption, by sex, the duration in months and years of fatal cases of 441
12, consumption, by sex, the duration of cases still sick, in months and years 442
Test of tuberculous cattle at Tecumseh, in 1894 446
1, kerosene, casualties in Michigan and in Detroit, in 1894, from use of 473
2, kerosene, casualties and damage consequent on the use of, in each of years, 1889-94 474

Page

Table 3, kerosene, casualties and damage consequent on the use of, in each of years, 1889-94, in Detroit ... 474
4, kerosene, casualties consequent on the use of, under the different tests for the years, 1889-94 ... 475
1, casualties and loss caused by use of gasoline, in Michigan, outside of Detroit in 1894 ... 485
1, number of places in Michigan, from which communicable diseases were reported, by weeks, in 1894 ... 151
2, numbers of cases and deaths from diphtheria, scarlet fever, typhoid fever and measles per outbreak where isolation and disinfection were enforced and where neglected, for each of, and average for 5 years, 1890-94 ... 154
3, scarlet fever and diphtheria, outbreaks, cases and deaths, and average cases and deaths per outbreak where isolation and disinfection were enforced, and neglected, for 8 years, 1887-94 ... 156
4, saving of cases and lives by isolation and disinfection of diphtheria, scarlet fever, typhoid fever and measles in each of and average for 5 years, 1890-94 ... 160-161
5, exhibiting the deaths and death-rates from scarlet fever, small-pox and typhoid fever before their restriction was undertaken by the State Board of Health ... 162
6, deaths and death-rates from scarlet fever and small-pox for 1874-94, and from typhoid fever for years, 1879-94 ... 163
7, deaths from scarlet fever, small-pox and typhoid fever before and after restriction by State Board of Health ... 164
and diagram, remarks relative to ... 166-167
8, comparison of annual number of lives saved, cases prevented and money saved by public-health work in scarlet fever, small-pox and typhoid fever for two periods of years ... 168
9, by periods of years the average annual death-rate from scarlet fever, small-pox and typhoid fever, and rate of life saving from scarlet fever and small-pox ... 170
I, outbreaks of diphtheria, scarlet fever, typhoid fever, small-pox, measles and consumption for third quarter of 1894, newspaper reports confirmed and denied ... xliii
I, outbreaks of diphtheria, scarlet fever, typhoid fever, small-pox, measles and consumption for last quarter of 1894, newspaper reports confirmed and denied ... xlix
1, outbreaks of diphtheria, scarlet fever, typhoid fever, small-pox, measles and consumption for first quarter of 1895, newspaper reports confirmed and denied ... lvii
2, outbreaks of diphtheria, scarlet fever, typhoid fever, measles, small-pox and consumption for second quarter of 1895, newspaper reports confirmed and denied ... lxvi
II, outbreaks of diphtheria, scarlet fever, typhoid fever, small-pox, measles and consumption for year 1894, newspaper reports confirmed and denied ... li
1, whooping-cough, outbreaks, localities, cases and deaths, cases and deaths per 10,000 inhabitants and ratio of deaths to cases, for each of and average for 8 years, 1887-94 ... 377
1, per cent of observers reporting each of 28 diseases, for each of years, 1882-94, average for 1877-93, and for 8 years, 1886-93 ... 97
1, (con.) per cent of observers reporting the several diseases, by months, for 1893-94, and average by months, for 1886-93, and 1877-93 ... 98-99
2, weekly reports of diseases, by year and months and summary relating to, in Michigan, in 1894 ... 100-101
2, (con.) per cent of reports stating presence of diseases for years, 1877-93, 1886-93, and by months in 1894, from each of 11 geographical divisions ... 102-109
4, a summary for 1894 relative to diseases, in each of the 11 divisions of the State, prevalence as regards time and area ... 110-111
Tecumseh, absolute humidity at, by months in 1894, Table IV, Diagram III ... 32-33
atmospheric pressure at, by months, in 1894, Table XVII, Diagram XVI ... 72-73
average daily range of atmospheric pressure at, by months, in 1894, Table XV ... 69
average daily range of temperature at, by months, in 1894, Table III, Diagram II ... 26-27
average temperature at, by year and months for 1894, Table I, Diagram I ... 20-21
cloudiness at, in 1894, Table VI, Diagram VI ... 42-43
consumption at, restricted, results, correspondence, etc ... 430-432
extremes and range of temperature at, in 1894, Table II ... 20-23
fog at, in 1894, Exhibit 23 ... 38-41
glanders at, in 1894, correspondence relative to ... 464-465

	Page
Tecumseh, latitude, longitude, altitude, average temperature and atmospheric pressure at, in 1894, Exhibit 2	3
meteorological conditions at, in 1894, used in studying sickness, Exhibit VIII	118
ozone, day, at, in 1894, Table VIII	50
ozone, night, at, in 1894, Table IX	52
rainfall at, in 1894, Table VII	48
range of atmospheric pressure at, by months, in 1894, Table XVI	70
relative humidity at, by months, in 1894, Table V, Diagram IV	34–35
suspected cattle at, tested by tuberculin, in 1894	443–446
wind at, direction, months in 1894, Table XIII, Diagram XV, Diagram XII, Table XIV	62–68
Tefft, C. C., meteorological observer at Tecumseh, in 1894	2
Tekonsha township, Calhoun Co., diphtheria at, traced to sore throat	195
Temperature and conditions of the atmosphere in Michigan	18–26
average, by year and months, 1894, at each of, and average for 11 stations in Michigan, Table I	21
average, by year and months, 1894, at State Board of Health, Lansing, Exhibit 12	24
average, by year and months for 1894, compared with 1893, and the 15 years, 1879-93, at Lansing, Exhibit 11	19
average, by year and months, 1894, compared with 1893, and the 17 years, 1877-93, at stations in Michigan, Exhibit 9	18
average, by year and months for years, 1864-94, and average for 30 years, 1864-93, at Agr'l College, Exhibit 5	6
average, by year and months, for years, 1879-94, and average for 15 years, 1879-93, at State Board of Health, Lansing, Exhibit 4	5
average, by year and month for years, 1877-94, and for the 17 years, 1877-93, at stations in Michigan, Exhibit 3	4
average, by year and months, in 1894, compared with 1893, and the averages for 30 years, 1864-93, at Agr'l. College, Exhibit 10	19
average daily range of, by months, for each of 7, and average for 16 stations, in Michigan, Diagram II	27
average daily range of, by year and months, 1894, at each of and average for 16 stations, in Michigan	26
average daily range of, by year and months, 1894, compared with 1893, and averages for 20 years, 1874-93, at Agr'l College, Exhibit 14	25
average daily range of, by year and months, 1894, compared with 1893, and averages for 15 years, 1879-93, at stations in Michigan, Exhibit 13	24
by months, at each of 8, and average line for 11 stations in Michigan, 1894, Diagram 1	20
extremes and range of, by months, for 7 years, 1888-94, and for 1893, compared with averages for 1873-93, at Agr'l College, Exhibit 16	29
extremes and range of, by months, for 7 years, 1888-94, and for 1894, compared with average for 1877-93, at stations in Michigan, Exhibit 15	28
extremes and range of, by months, in 1894, at stations in Michigan	22–23
of ground-water	15
of water, compared with depth of earth above ground-water, at Lansing, and sickness from typhoid fever, for period of years, Table 22	327
of water in well at Lansing, by months, for the 10 years, 1885-94, and average for the 8 years, 1886-93, Table 21	327
Thornville, absolute humidity at, in 1894, by months, Table IV, Diagram III	32–33
atmospheric pressure at, by months, in 1894, Table XVII, Diagram XVI	72–73
average daily range of atmospheric pressure at, by months, in 1894, Table XV	69
average daily range of temperature at, by months, in 1894, Table III, Diagram II	26–27
average temperature at, by year and months, in 1894, Table I, Diagram I	20–21
cloudiness at, in 1894, Table VI, Diagram VI	42–43
extremes and range of temperature at, in 1894, Table II	22–23
fog at, in 1894, Exhibit 28	38–41
latitude, longitude, altitude, Av. Temp. and atmospheric pressure at, in 1894, Exhibit 2	3

	Page
Thornville, meteorological conditions at, in 1894, used in studying sickness, Exhibit VIII	118
meteorological phenomena at, in 1894	12-15
ozone, day, at, in 1894, Table VIII, Diagram VIII	50-51
ozone, night, at, in 1894, Table IX, Diagram IX	52-53
rainfall at, in 1894, Table VII, Diagram VII	48-49
range of atmospheric pressure at, by months, in 1894, Table XVI	70
relative humidity at, by months, in 1894, Table V, Diagram IV	34-35
sunny and cloudy days at, by months, in 1894	77-78
wind at, direction, months in 1894, Table XIII, Diagram XV, Diagram XII, Table XIV	62-68
Tittabawassee river, dead horse in, an alleged nuisance	494
Toledo, O., removal of corpse from, to Monroe, Mich., in 1894	449-450
Tonsillitis and diphtheria and meteorological conditions, by months, in 1894, Exhibit XIV	128
by year and months in 1894, compared with 1893, and with averages for 15 years, 1879-93, and for 8 years, 1886-93, Exhibit XIII	126
causing in Michigan, in 1894, more sickness than the average of diseases, Exhibit VI	115
causing more sickness than the average of diseases in 1894, by State Divisions, Exhibit VII	116-117
order of prevalence of, for each of years, 1882-94, and average for 1882-93, Exhibit I	112
per cent of observers of, weeks present, per cent and weekly reports of, and average order of prevalence of, in State and divisions of State, Table 2	100-109
per cent of observers reporting presence of, for each of several years, and in two periods of years, and by months, in years, 1893-94, and two periods of years, Table 1	97-99
per cent of reports stating presence of, by months, in 1894, and averages for periods of years, Exhibit II	88
per cent of reports stating presence of, by years, 1882-94, and average for periods of years; also, by months, for 1893-94, and for periods of years, Exhibit IV	91-93
prevalence of, in 1894, as regards time and area, by Divisions, Table 4	110-111
rise and fall of, by months, in 1894, Diagram 2	125
summary of relations of, to climatic conditions, Exhibit XXV	143
Transit permits for body dead from communicable disease	449
Transportation of corpses dead of consumption	lxi
person sick or dead from diphtheria	212-213
Traverse City, absolute humidity at, by months, in 1894, Table IV, Diagram III	32-33
atmospheric pressure at, by months, in 1894, Table XVII, Diagram XVI	72-73
average daily range of atmospheric pressure at, by months, in 1894, Table XV	69
average daily range of temperature at, by months, in 1894, Table III, Diagram II	26-27
average temperature at, by year and months for 1894, Table I, Diagram I	20-21
cloudiness at, in 1894, Table VI, Diagram VI	48
depth of well, of ground above water in well and temperature of water at, by months, in 1894, Exhibit 8	16-17
extremes and range of temperature at, in 1894, Table II	22-23
fog at, in 1894, Exhibit 23	38-41
latitude, longitude, altitude, average temperature and atmospheric pressure in 1894, Exhibit 2	3
meteorological conditions at, in 1894, used in studying sickness, Exhibit VIII	118
ozone, day, at, in 1894, Table VIII, Diagram VIII	50-51
ozone, night, at, in 1894, Table IX, Diagram IX	52-53
range of atmospheric pressure at, by months, in 1894, Table XVI	70
rainfall at, in 1894, Table VII	48
relative humidity at, by months, in 1894, Table V, Diagram IV	34-35
wind at, direction, months in 1894, Table XIII, Diagram XV, Diagram XII, Table XIV	62-68
Trufant, an alleged nuisance at	503
Tubercular diseases and cancer of breast, question of possible relation between	438-439
Tuberculin, cattle at Tecumseh, tested by, in 1894	443-446
test of tuberculous cattle in Tecumseh by, Table	446
Tuberculosis (see consumption).	
in cattle, in Michigan, in 1894	443-446

	Page
Tuberculosis, suspected in cattle at Tecumseh, in 1894, test, correspondence, etc.	443-446
Typhoid fever, age distributions of deaths from, in 1894, Diagram	319
age of occurrence of	317-319
alleged to be caused by yellows in peaches	307-309
and typho-malarial fever and meteorological conditions, by months, in 1894, Exhibit XXII	140
at Duncan township, Houghton Co., correspondence, and diagram of	299-300
Iron Mountain, in 1894	298-299
Marine City, analysis of water supply	xlvi-xlvii, 303
Marquette, correspondence and diagram	301-302
McBain, Missaukee Co., diagram of locality, etc.	303-304
Riley township, St. Clair Co.	306
State House of Correction	300-301
Walker township, Kent Co., attributed to unsanitary conditions	305
average duration by sex, of non-fatal cases of, 8 years, 1887-94, Table 11	316
average duration in days, by sex, of fatal cases of, 8 years, 1887-94, Table 10	315
average number of cases and deaths per outbreak, isolation and disinfection enforced, neglected, doubtful, etc., 1894, Table 8	312
average per cent of weekly card-reports stating presence of, by months, for each of 10 years, 1885-94, average for 10 years, 1878-87, and for 8 years, 1886-93, Table 19	326
by periods of years, the annual rate of deaths	170
by sex and age-groups, the number of deaths from, during 1892-94; also average deaths per 10,000 inhabitants, Table 14	318
by sex and age-groups, the per cent of deaths from, during 1892-94; also per cent deaths in each age-group were of all deaths, Table 13	318
by sex and age-groups, the per cent of persons sick from, during 8 years, 1887-94, Table 12	317
cases and deaths by counties, in Michigan, in 1894, Map	281
cases and deaths per 10,000 population, by tiers of counties, in 1894, Table 3	279
cases and deaths per 10,000 population, in each county in Michigan, in 1894, Table 4	280
cases and lives saved from, in each of, and average for 5 years, 1890-94, Table 9	314
cases and lives which should have been saved from, in each of and average for 5 years, 1890-94, Exhibit II	314
causing more or less sickness than the average of diseases, in 1894, by State Divisions, Exhibit VII	116-117
comparison of deaths from, before and after its restriction by State Board of Health, Table 7 and Diagram	164-165
comparison of lives saved, sickness prevented and money value saved in two periods of years, by public health work	168
deaths and death-rates from, for 16 years, 1879-94, Table 6	163
deaths and death-rates from, for 10 years before restriction of was undertaken by State Board of Health, Table 5	162
deaths from, 27 years, 1868-94	174
death-rates from, in 1894	282-283
decreasing death-rate from, 26 years, 1869-94, Diagram 7	174
depth of earth above water in well, temperature of water, at Lansing, averages by months for 8 years, 1886-93, Table 22	327
diagram, isolation and disinfection restricted, in Michigan, in 1894	313
distribution of, by Divisions and counties, in 1894	278-281
final report relative to (blank form)	149-150
first, second and third localities, second infected from first and third from second, names of localities, numbers of cases and deaths, Table 7	287-292
in each month of 1894	284-286
in 1894, compared with previous years	276-277
in 1894, compared with 1893, and with averages for 17 years, 1877-93, and for 8 years, 1886-93, Exhibit XX	137
in Michigan, 1894	276-330

Page

Typhoid fever, localities, outbreaks, cases and deaths, average cases and deaths per outbreak, and ratio of deaths to cases, 11 years, 1884-94, Table 1 277
measures taken to restrict, results 310-314
movements of contagium of, in Michigan, in 1894, Map 286
number and per cent of cases of, in each month of 1894, Table 6 285
numbers of cases and deaths per outbreak, where isolation and disinfection were neglected and where enforced, in 5 years, 1890-94, Table 2 and Diagram 154-155
order of prevalence of, for each of years, 1882-94, and average for 1882-93, Exhibit A 112
outbreaks, attributed to contaminated water, localities, names of reporters, and quotations from reports 295-298
outbreaks, attributed to defective drainage and sewerage, localities, names of reporters and quotations from reports 304
outbreaks, attributed to exposure, overwork, etc., localities, names of reporters and quotations from reports 306
outbreaks, attributed to filth and unsanitary conditions 305
outbreaks of, reports relative to, during third quarter of 1894, Table I xliii
last quarter of 1894, Table I xlix
first quarter of 1895, Table I lvii
second quarter of 1895, Table I lxvi
year 1894, Table II li
outbreaks of, which began, ended and were present in each month of 1894, Table 5. 284
pamphlet on restriction and prevention of, third quarter of 1894 xlv
per cent of cases reported, per cent of outbreaks which began, and height of ground-water, by months, for each of 9 years, 1886-94, Table 18 325
per cent of observers of, weeks present, per cent and weekly reports of, and average order of prevalence of, in State and Divisions of State, Table 2 100-109
per cent of observers reporting presence of, for each of several years, and in two periods of years, and by months in years, 1893-94, and two periods of years, Table 1 97-99
per cent of reports stating presence of, and outbreaks, localities, cases and deaths from, for each of 10 years, 1885-94, and average for 8 years, 1886-93 321
per cent of reports stating presence of, by months, in 1894, and averages for periods of years, Exhibit II 88
per cent of reports stating presence of, by years, 1882-94, and average for periods of years; also, by months, for 1893-94, and for periods of years, Exhibit IV 91-93
prevalence of, in 1894, as regards time and area, by Divisions, Table 4 110-111
probably spread through the agency of flies 306-307
relation of low water in wells to, during 16 years, 1878, 1880-94, Table 16 323
relation of, to low water in wells 324
reported deaths from, per 100,000 persons living, 27 years, 1868-94, Table 2, Diagram. 278
restriction of 153
rise and fall of, by months, in 1894, Diagram 5 138
saving of lives and cases by isolation and disinfection of in each of 5 years, 1890-94, Table 4 161
sickness from, and low water in wells, for 14 years, 1878, 1880-92, Diagram 322
sickness from, average total annual rainfall and depth of ground-water in well at Lansing compared, Table 23 330
sickness-rates from, in 1894 282
source of contagium of, in Michigan, in 1894, Exhibit I 285
spreads most in thickly-inhabited places 283-284
summary of relations of, to climatic conditions, Exhibit XXVI 144
traced to former cases in distant places, names of localities and reporters, and quotations from reports 293-295
traced to outside the jurisdiction, localities, names of reporters, and quotations from reports 293-295
two lines of evidence of the prevalence of 320

Typho-malarial and typhoid fever and meteorological conditions, by months, in 1894, Exhibit XXII 140

Page

Typho-malarial fever, causing more or less sickness than the average of diseases in 1894, by State Divisions, Exhibit VII ... 116-117
in 1894, compared with 1893, and with averages for 17 years, 1877-93, and for 8 years, 1886-93, Exhibit XX ... 137
order of prevalence of, for each of years, 1883-94, and average for 1881-93, Exhibit A ... 113
per cent of observers of, weeks present, per cent and weekly reports of, and average order of prevalence of, in State and Divisions of State, Table 2 ... 100-109
per cent of observers reporting presence of, for each of several years, and in two periods of years, and by months in years, 1893-94, and two periods of years, Table 1 ... 97-99
per cent of reports stating presence of, by months, in 1894, and averages for periods of years, Exhibit II ... 88
per cent of reports stating presence of, by years, 1883-94, and average for periods of years; also, by months, for 1893-94, and for periods of years, Exhibit IV ... 91-93
prevalence of, in 1894, as regards time and area, by Divisions, Table 4 ... 110-111
rise and fall of, by months, in 1894, Diagram 5 ... 128
summary of relations of, to climatic conditions, Exhibit XXVI ... 144
Typhus fever, alleged, in Michigan, in 1894, reporters, quotations from reports, location, etc. ... 374-376
Tyrotoxicon, sickness from, suspected, in Michigan, in 1894 ... 452
Union City, sanitary convention at ... xi-xii, lv
Unsanitary conditions in school-house in Mayville, an alleged nuisance ... 497
of school and dwelling houses, in Michigan, in 1894 ... 494-497
outbreak of typhoid fever at Walker township, Kent Co., attributed to ... 305
outbreaks of diphtheria traced to, localities, names of reporters and quotations from reports ... 195
outbreaks of typhoid fever attributed to, localities, names of reporters and quotations from reports ... 305
scarlet fever attributed to, with locality, name of reporter and quotation from report ... 287
Vaccination, after exposure to small-pox ... 412-413
leaflet, correspondence, and inquiries relative to, and quotations from some of the letters ... 408-412
of large numbers of railway employés, results ... 413-414
Varicella (see chicken-pox).
Variola (see small-pox).
Vaughan, M. D., V. C., report of International Congress of Hygiene at Buda-Pesth, by ... xci-civ
Venice township, Shiawassee Co., neglected outbreak of measles at ... 358-359
outbreak of scarlet fever at ... 254
Waite, S. E., meteorological observer at Traverse City in 1894 ... 2
Waldron, V. S., Chas. A., correspondence with, and report from, relative to test, etc., of tuberculous cattle at Tecumseh ... 445-446
Walker township, Kent Co., outbreak of typhoid fever at, attributed to unsanitary conditions ... 305
Walter, William, letter from, relative to neglected outbreak of measles, in Allendale township, Ottawa Co. ... 351
Warm weather diseases (see diseases).
Water, contaminated or impure, outbreaks of typhoid fever attributed to, localities, names of reporters, quotations from reports ... 295-298
Weather and health in Michigan (see Health).
Webber, M. D., N. W., correspondence with, relative to transportation of diphtheria from Wyandotte to Detroit ... 225-226
Weekly reports (see reports).
Wells at certain stations in Michigan, in 1894, depth of and temperature of water, Exhibit 8 ... 16-17
low water in, relation of, to typhoid fever ... 324
water low in, and sickness from typhoid fever, for 14 years, 1878, 1880-94, Diagram ... 322

Page

Wells, Hon. Frank, communication from, to National Conference of State Boards of Health, Plea for National System of Quarantine xcvii-xcix
President's address by xxxv-xxxviii
West Bay City, kerosene accident at 481
Westphalia township, Clinton Co., outbreak of scarlet fever at 254
Wheatland township, Mecosta Co., lump-jaw at, correspondence relative to, names of reporters, etc. 470-471
Whelan, M. D., Bion, mention of paper on consumption by 426
White, Wm. H., H. O., letter from, relative to measles at Venice township, Shiawassee Co. 359
report relative to outbreak of scarlet fever at Venice township, Shiawassee Co. 254
Whooping-cough and measles and meteorological conditions, by months, in 1894, Exhibit XXIII 141
causing in Michigan, in 1894, less sickness than the average of diseases, Exhibit VI 115
causing more or less sickness than the average of diseases in 1894, by State Divisions, Exhibit VII 116-117
in 1894, compared with 1893, and with averages for 17 years, 1877-93, and for 8 years, 1886-93, Exhibit XX 137
in Michigan, in 1894 377-378
order of prevalence of, for each of years, 1882-94, and average for 1882-93, Exhibit A 112
outbreaks, localities, cases and deaths, cases and deaths per 100,000 inhabitants and ratio of deaths to cases for each of and average for 8 years, 1887-94, Table 1 377
per cent of observers of, weeks present, per cent and weekly reports of, and average order of prevalence of, in State and Divisions of State, Table 2 100-109
per cent of observers reporting presence of, for each of several years, and in two periods of years, and by months, in years, 1893-94, and two periods of years, Table 1 97-99
per cent of reports stating presence of, by months, in 1894, and averages for periods of years, Exhibit II 88
per cent of reports stating presence of, by years, 1882-94, and average for periods of years; also, by months, for 1893-94, and for periods of years, Exhibit IV 91-93
prevalence of, in 1894, as regards time and area, by Divisions, Table 4 110-111
rise and fall of, by months, in 1894 127
summary of relations of, to climatic conditions, Exhibit XXVI 144
Wind, direction by months, average for 10 stations in Michigan, in 1894, Table XII, Diagram XIV 61
direction of, at stations in Michigan, by months, in 1894, Table XIII, Diagram XV, Diagram XII, Table XIV 62-68
direction of, by months, 1878-89, Exhibit 34, Diagram XIII 60
velocity of, by hours and months, in 1894, Table X, Diagram X 56-57
velocity of, by months, in 1894, compared with 1893, and with averages for years, 1880-93, at Lansing (State Board of Health), Exhibit 33 55
velocity of, by months, in 1894, compared with 1893, and with averages for 12 years, 1882-93, at stations in Michigan, Exhibit 32 55
velocity of, miles per hour, by months, 1894, at each of and average for 8 stations in Mich., Table XI, Diagram XI 58-59
Winsor township, Huron Co., an alleged nuisance at 510-511
Wood, M. D., D. H., letter to, from Dr. Baker, relative to duty of health officer to accept diagnosis of physicians 260-261
Woodstock township, Lenawee Co., an alleged nuisance at, correspondence, etc. 510
Wunch, M. D., Charles, correspondence with, relative to neglected outbreak of measles at Saranac, Ionia Co. 353-354
Wyandotte, transportation of case of diphtheria from, to Detroit 225-227
Yellows in Peaches alleged to be the cause of typhoid fever 307-309
Yeomans, M. D., T. N., report from, relative to outbreak of scarlet fever in Bancroft village 255
Yerrington, M. D., S. D., correspondence with, relative to typhoid fever at McBain, diagram of locality, etc. 303-304
Young, M. D., A. G., Secretary State Board of Health of Maine, Secretary Baker's letter to xl

ERRATA.

On page cxxviii, last full line on page, the dash ——, should read *xxviii, xxvix-xi.*

On page 32, in the last line on page, the dash ——, should read *33.*

On pages 66 and 67, in the last lines in the Note under Table XIV and XIV Continued, the dash ——, should read *59.*

On page 132, in the heading of Exhibit XVIII, near the end of the second line, the word *fourteen* should read *sixteen;* and the sixth word in the third line, *six*, should read *eight.*

On page 146, in the heading of Exhibit XXVII, the fifth word in second line, *seventeen*, should read *eighteen.*

On page 150, under the sub-head "Note.—RELATIVE TO SPECIAL FINAL REPORTS," etc., in the third paragraph, the fifth word in the third line, *impossible*, should read *possible.*

On page 225, under the Sub-head, "DIPHTHERIA IN DETROIT AND GRAND RAPIDS, IN 1894." the last of the fourth line, dash ——, should read *190.*

LANE MEDICAL LIBRARY

To avoid fine, this book should be returned on or before the date last stamped below.

